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# 3dcreative

Issue 081 May 2012

Cover image by Anto Juricic

## Etienne Jabbour
3D Character Artist

## Gallery Artist
Gallery - 10 of the best images from around the world!

## The Orange
Project Overview by Riccardo Zema

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**Anto Juricic** and **Rodrigue Pralier** face up to the challenge of modeling the features in the second part of our **Character Production** series.

# MODELING MASTERCLASS

## Armored Rhino
In this fifth chapter of our **Armored Beasts** series **Jose Alves da Silva** talks us through the creation of his epic rhino sculpt.

## Guide to FX - Particles & Dynamics
**Matt Chandler** (3dsmax) and **Mike Zugschwert** (Maya) continue this month by showing us how to create and animate smoke.

## Medi Droid
Once again using a 2D concept **Tarik Ali** shows us how to model and texture a cool Medi Droid in our **Building Droids** series.


# Editorial

Hello and welcome to the May issue of 3DCreative. In this month's magazine we continue some of our great new tutorial series, so hopefully you will all have an exciting new project to get stuck into and fill you with inspiration!

You will notice that we're lucky enough to have yet another amazing cover image, this time created by Anto Juricic. This image comes from the Maya version of our Character Modeling series focusing on the modeling of an old man's head. This month, our two fantastic artists will be showing us how to model the features and detail onto the base model that was created in April's issue. Rodrigue Pralier continues to walk us through the process in 3ds Max, whilst Anto covers Maya.

In the second part of our tutorial series covering FX, Particles and Dynamics, Matt Chandler and Mike Zugschwert move away from creating and animating water and turn their attention to smoke, with Matt working in 3ds Max and Mike in Maya. They don't only show us how to set up the effects, but also demonstrate how to manipulate them to match an environment or scenario of your choice, making this a must-read tutorial!

Not two, but three new series were kick-started in last month's issue, the third of these being Building Droids. Tarik Ali is our instructor this time around and he shows us how to use a 2D concept and technical drawing of a cool, sci-fi droid, provided by a talented 2D artist, and turn it into an accurate 3D model in 3ds Max.

As well as these second installments in our collection of new series, we also have another brilliant chapter from our Modeling Armored Beast's series. Regular contributor to 3DCreative, Jose Alves da Silva, talks us through the process he used to create his armored rhino. Using and explaining extensive tools found in ZBrush 4R2, he unleashes his creativity with great effect and shows us how he created this stunning image.

The magazine is fit to burst with exciting tutorials this month, but the excitement doesn't end there! We also have a great interview with the brilliant Etienne Jabbour, a fun Making Of by Riccardo Zema and a gallery containing some of the best of the current 3D artwork in the community, including work from Tiago Hoisel, Tim Jones, Oliver Pabilona and many more. So sit back, relax, and enjoy!

# Contents

What's in this month?





| Editor | Layout | Content | Proofing |
|---|---|---|---|
| Simon Morse | Matthew Lewis | Simon Morse | Jo Hargreaves |
| | Layla Khani | Richard Tilbury | |
| **Lead Designer** | Az Pishneshin | Jessica Serjent-Tipping | **Marketing** |
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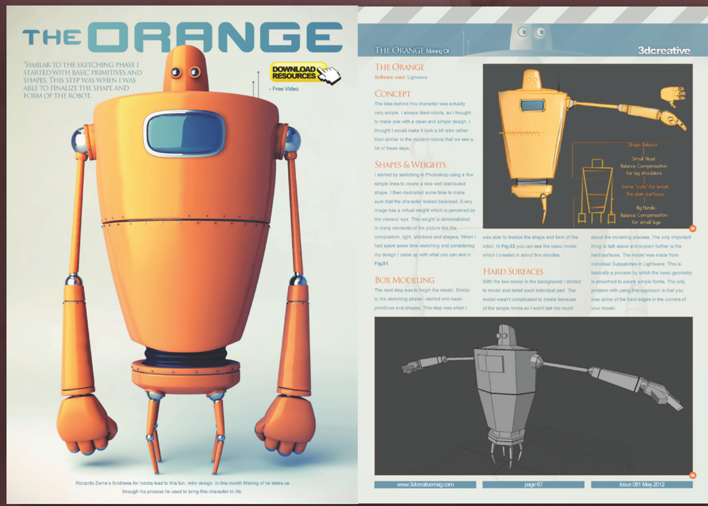


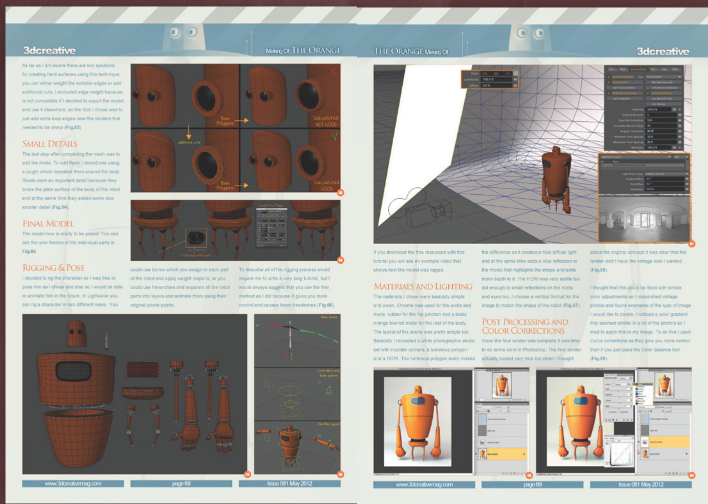

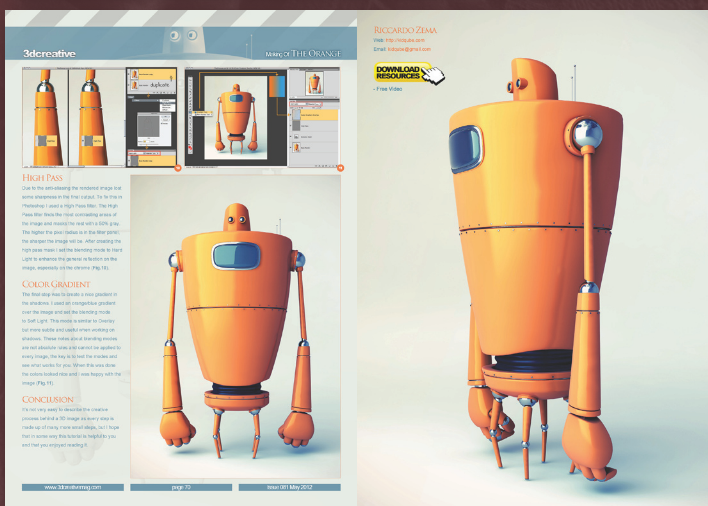

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**1. Open the magazine in Reader;**
**2. Go to the VIEW menu, then PAGE DISPLAY;**
**3. Select TWO-UP CONTINUOUS, making sure that SHOW COVER PAGE is also selected.**

**That's it!**

# Contributing Artists

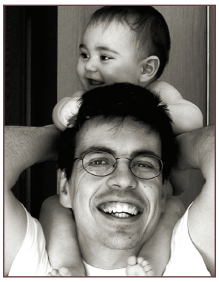
Every month artists from around the world contribute to 3DCreative, and you can find out a little more about them right here! If you'd like to get involved in the 3DCreative magazine, please contact: simon@3dtotal.com

## Mike Zugschwert

Mike Zugschwert is an FX Artist who works in Realflow, Maya, and 3DS Max. He was the Lead FX Artist for the short film Azureus Rising and now applies his talents to television commercials. He is currently working at Make in Minneapolis, MN.

http://www.mikezfx.com

mzugschwert@gmail.com

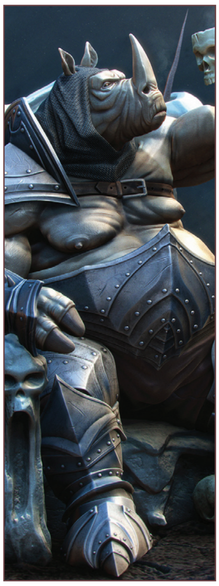


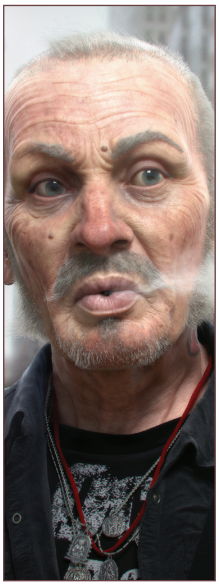
## Jose Alves da Silva

Jose Alves da Silva has been working in the 3D field for over 15 years. Jose has a degree in Architecture but now works as a full time freelancer dedicated to his true passions - character creation and illustration. This has given Jose the opportunity to work on some spectacular projects in the feature film, advertising and gaming industries.

http://www.artofjose.com/

joalvessilva@netcabo.pt





## Rodrigue Pralier

Rodrigue Pralier is the lead Character artist at Bioware Montreal Quebec. After working in the games industry for nearly a decade he has recently shipped the highly anticipated game Mass Effect 3 and has previously worked on other games like Army Of Two:40th day.

http://www.rodriguepralier.com/

rodriguepralier@hotmail.com

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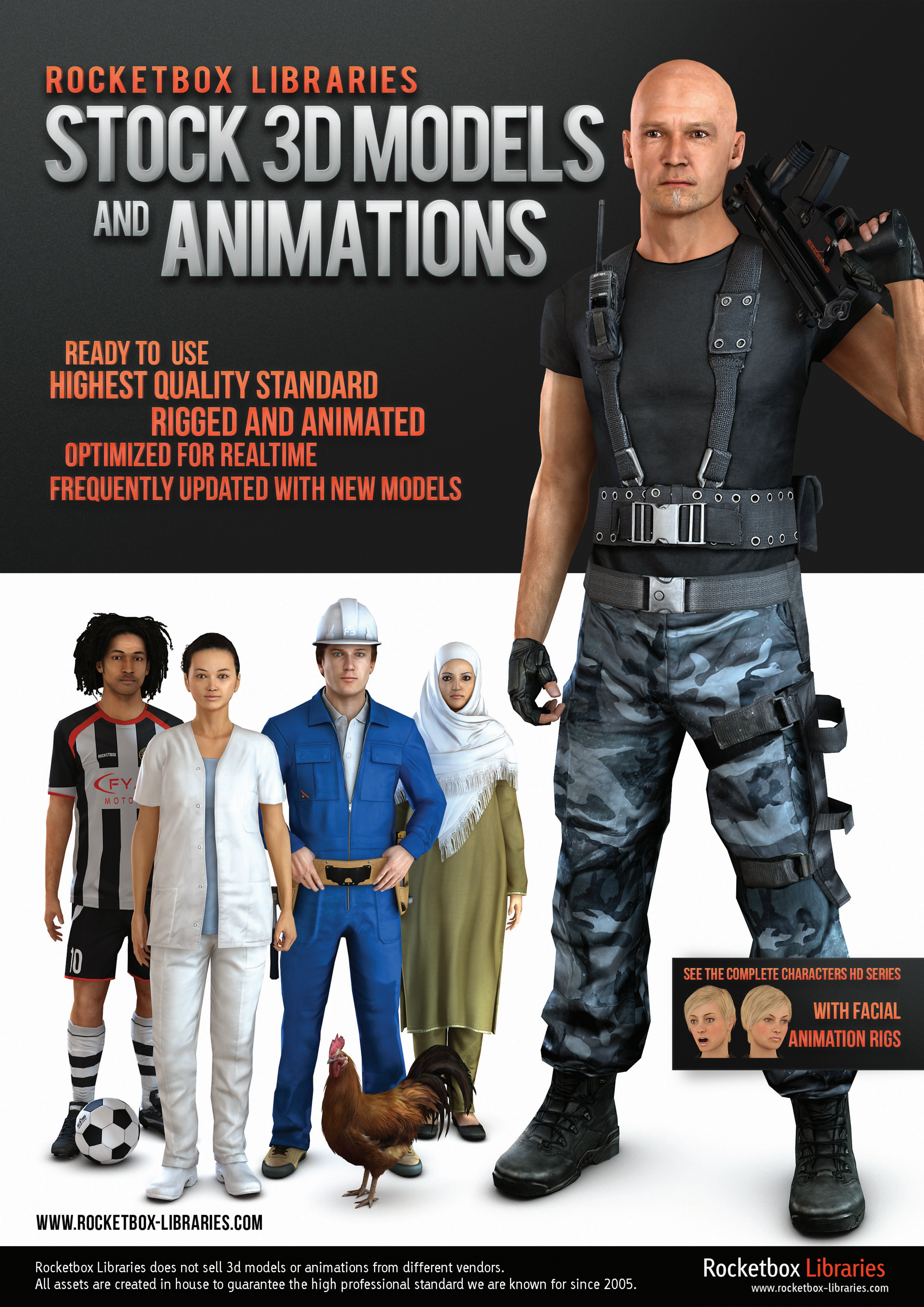
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# Etienne Jabbour

Etienne Jabbour is a 3D character artist living in London, whose career has seen him design characters at the Cartoon Network and land a position as lead character artist at Kuju London. In this month's exclusive interview he talks to us about Slide London, Qev and the next generation of hardware.

"You can have fantastic costume design that's dropped onto a character with dull proportions and a generic face, and the costume will lose all impact"

**Can you tell us a little about your background and how you came to be where you are now?**

I started out when I was around 19 as a figurative illustrator doing commissioned graffiti work and album covers for labels like Deconstruction and Blue Room records. As I had an equal passion and training in animation and sculpture (specializing in character design and form/expression model sheets and maquettes), I learned 3D as it seemed like an ideal avenue for producing my own content.

After a couple of lucky breaks, including the opportunity to produce concepts, character designs and synopsis with the Cartoon Network, the dotcom crash and steady decline of TV animation budgets meant I started looking at new industries; specifically the games industry.

My first job in the games industry was as Lead Character Artist and Lead Animator for Kuju/Headstrong games where I mostly worked on their first party Nintendo titles and pitches, although I also worked on (then) early "next gen" PS3 and 360 character demos. The experience on these demos drove me towards ZBrush and digital sculpting, which I got into in my spare time and found an affinity with as it tapped into my time learning traditional sculpture.

In 2006 I set up Slide with my now business partner Robin Deitch. Over the past several years we have established Slide as one of the premier character art specialists in the industry (characters are all we do). We're lucky enough to work with amazingly talented development teams, production studios and artists from around the world on cinematics and high profile, character-led, core console titles, creating hero and central characters (including everything from look development to final assets). We are currently working on a dream project built around very well-known character IPs. Nothing we can talk about yet, but something we're all very excited to be a part of.


slide
slidelondon.com
CAPTIVATING
CHARACTERS

**Do you have a team broken up into dedicated tasks and roles such as concept art or does everyone work across the numerous disciplines?**

We generally approach each character in small teams rather than having a single character handled by an individual character artist. If you have a tight team this makes it easier to work within a project's style and ensures consistent quality across all the characters we produce.

We split a character into the areas of production where different skills and considerations are required of the artist, such as concept sculpting, modeling, production sculpting, head sculpting, resurfacing/UV creation and texture creation. Most of us do more than one of the above, but we like our artists to work on the one or two aspects of character creation they are strongest at/most passionate about. Of course all our artists are accomplished, well-rounded character artists able to produce fantastic characters single-handedly, but the idea is that as a studio we produce characters that are stronger than any one artist can create on their own.

**What are the most demanding tasks placed on a character artist working in your sector of the industry?**

At the moment it's bringing an ever higher level of fidelity and believability to characters on existing console hardware with the very limited memory, lighting, shader and animation capabilities most developers have to deal with. Luckily our work on cinematic and marketing characters, as well as our ongoing internal RnD, means we have a lot of knowledge of how to really push characters using our high res pre-rendered character work as visual benchmarks. As the next generation of hardware rolls out we're very well-placed to squeeze the most out of it right from the start.

**How do you think the next gen hardware will advance character development?**

It's too early to say exactly what tricks next gen will allow for once people get to grips with it.

Looking at offline renderers and knowing what's been driving improvements in CG characters for films, TV and game cinematics in the past couple of years gives a good indication of the kinds of techniques that could be used to take real-time characters to the next level.

The main areas that stand to improve the most for RT characters are the lighting/shading and deformation/animation, so I'd expect most of the changes in production will be about taking advantage of any advances the next generation of hardware allows for in these areas.

**Can you describe your typical pipeline and process when undergoing a character design?**

For personal work or internal projects at Slide I start out with a very vague, high-level concept; the core of an idea that's just a mixture of mood, intent and a few specific details.

I then spend time Googling words and images that are connected to this high-level concept and slowly build up a visual library until a clearer direction comes together in my mind.

Then I develop the design through a mixture of sculpting and drawing, as well as further reference gathering. All fairly standard stuff as far as costume design goes.

With faces I'm careful to use specific references just to inform my sculpture, rather than using the references as actual direction. One thing you see a lot of in "realistic" CG characters are

models created that are almost entirely based on a real person, which can lose the expressive side of non-photoreal character design; the dark art of conjuring up features that manage to telegraph the character's key attributes.

**What aspects of your job do you find the most satisfying and in which areas would you like to see improved development with regards software and tools?**

Designing heads and faces using digital sculpting software is definitely my thing at the moment, and overall silhouette development and design is something I've always loved. Texturing is also something I enjoy, having spent time developing a fast and efficient sculpt-based texturing pipeline at Slide.

Hair is obviously still lagging way behind other aspects of character development, along with better and more standardized tools for facial performance retargeting.

**Tell us about Qev and the background behind his design?**

At Slide we try to produce one or two internal RnD-motivated projects a year. We had decided that what we needed was a good test for a character with super HD textures, and to establish a pipeline that allowed us to work on a character with 15 – 20 4k texture tiles (so between 40 – 60 individual 4k textures).

I have an ongoing theme in my personal work that's based around the idea of looking at contemporary urban culture through a near-future sci-fi lens, and felt a character from such a world would give us a great opportunity to test out this HD texture process over a range of hard surface subdivision models and displaced sculpted organic and clothing models. I also spent time designing his face as it was a testing ground for an approach to realistic facial design we have gone on to use across all our client work at Slide.

**How significant are your internal projects with regards to your commercial development?**

Incredibly so. We use our internal projects to spearhead pipelines, processes, approaches and considerations that are a year or two ahead of what our clients are typically after. If we relied

purely on client projects to define our ability as a studio we'd be heading down a cul-de-sac business-wise where the type of work we had been producing for clients up until that point would be all that defines us.

Essentially our internal projects allow us to take risks and they give us the pre-production time most projects can't afford. It's about giving ourselves time for the kind of experimentation that our clients then benefit from.

**Which game characters have impressed you over the years and why?**

There have been many characters that have impressed me at the time, but I think game characters have been so subjected to the technology they are created for that most fail to leave a lasting impression once this tech is superseded.

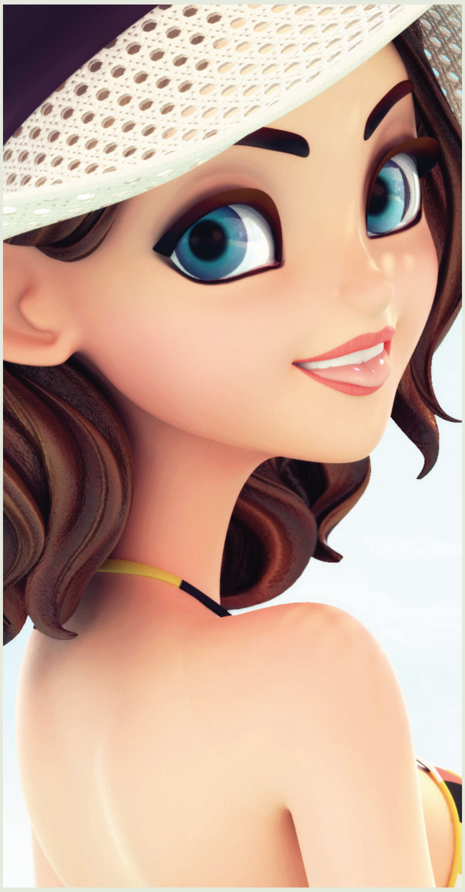
I think that's all changing now though, I believe the next gen (which we are already preparing for) will open the floodgates for characters that are memorable beyond the lifespan of the tech they live on, whether this is down to realism, the freedom to really express a project's high-level ambition through stylized art direction, or a combination of the two.

**What types of characters do you personally find the most interesting to model and what characteristics do you feel make for a strong concept?**

For me it's all about the face and physique and how the two interact with costume design. You can have fantastic costume design that's dropped onto a character with dull proportions and a generic face, and the costume will lose all impact. So I feel it's incredibly important for characters to have strong facial design and nuanced proportions.

ETIENNE JABBOUR
Web: http://www.slidelondon.com/
Email: etienne@slidelondon.com
Interviewed by: Richard Tilbury


United States
Atlantis



# the GALLERY

**This month we feature:** Vo Tuan | DC | Oliver Pabilona | Yinxuan
Jan K. Vollmer | Tiago Hoisel | Simon Blanc | Maksim Ganzha A. | Guillermo Soria | Tim Jones

## WORKBENCH

**DC**

http://www.shining365.com/

xiali519@126.com

## CUBE

**Maksim Ganzha A.**

http://www.3dmaks.com/

maksimganzha@rambler.ru

Created for www.artbaza.ru

# Lavoir

**Tim Jones**
http://www.seraph3d.com
honokaitj@gmail.com

# BMW X6

**Vo Tuan**
cgmeth@gmail.com
(Right)


# Skylounge

**Jan K. Vollmer**
http://www.jankvollmer.de
jkv@elberfeld.de
(Below)

# THE SHOOTER

**Tiago Hoisel**
http://tiagohoisel.blogspot.com.br/
tiagohoisel@yahoo.com.br

FROZEN FRAME

**Salvador Ramirez** (Concept Art) http://reevolver.deviantart.com

**Omar Sealtiel** (Modeling and Texturing) http://www.exododw.com

**Guillermo Soria** (Lighting and Render) http://www.exododw.com | sdpost99@hotmail.com


## THE FLYING CIRCUS

**Simon Blanc**
http://www.simonblanc.com
sixmoon@gmail.com

(Above)

## EVANGELION MK-X PHYSICAL

**Oliver Pabilona**
http://rhythem02.deviantart.com/
olvr_pbln@yahoo.com

(Left)


ENJOYING SUMMER BREAK
Yinxuan
http://www.tyanim.com
li_yinxuan@hotmail.com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# GUIDE TO FX - PARTICLES & DYNAMICS

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*3DCreative* are branching out from creating stills in this amazing tutorial series, which will be looking at how to set up FX and particle systems in 3ds Max and Maya. Our amazingly talented artists will tackle some of the most common and popular effects, and will show us how to set them up and manipulate them to match an environment of your choice.

3ds max

## CHAPTER 02 **SMOKE**

# Chapter 02 – Smoke

Software used: 3ds Max

3ds Max has a wealth of third-party support, which means we have many options for creating effects using scripts, plugins and officially supported software that installs and integrates directly. In the accompanying video to this tutorial I have a brief look at using particle flow to create some small, simple smoke effects and talk about the limitations you may encounter.

In recent years the tool of choice for a plethora of smoke and fluid dynamic behaviors has been the plugin FumeFX by Sitni Sati. This tool allows us to create both fire and smoke effects that range from a small campfire to a volcanic eruption! It also allows us to create realistic smoke effects whilst being able to control the appearance and behavior for some amazingly realistic, yet impossible, visual effects.

In this tutorial we will be using a simple animated character mesh to emit smoke into our scene, creating a smoky figure that leaves a trail of dissipating smoke. It is assumed you already have a fundamental operating knowledge of FumeFX.

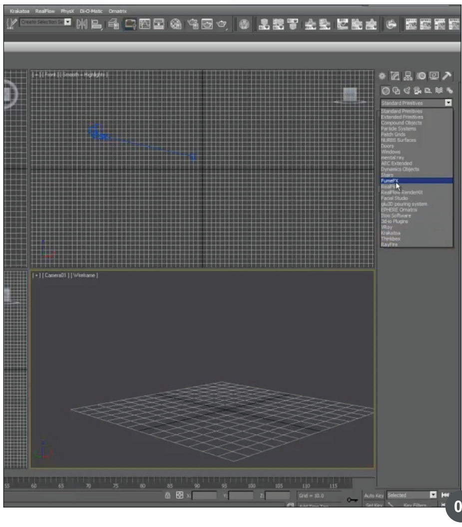
Open up the 3ds Max file named “smoke_scene.max”, which is provided with this tutorial. You will find a low resolution character mesh with a point cache modifier. You may need to redirect the point cache to the included point cache file. The included scene file is the file I used when recording the video tutorial and contains the final FumeFX scene for you to use and refer to.

Start by creating a new FumeFX grid (**Fig.01**). Study the path of the animated character, positioning and scaling the Fume grid/simulation box to contain the character. If the character walks outside of the box, FumeFX will no longer see the mesh and won’t be able to calculate any cool smoke (**Fig.02**).

Now we need to tell FumeFX to see our character mesh and, most importantly, emit smoke from the surface and be influenced by the velocities of the moving mesh. Under the Helpers tab there is a FumeFX menu. In the video tutorial I go over a few of these helpers and describe what they do. In this case, we want to use an Object Src helper. Select this and drag it out into the viewport.

With the helper selected you can add the character mesh to the helper. Now select the FumeFX grid and open up the GUI. Under the Obj/Src tab add the Obj source helper. This means FumeFX can now “see” the figure in the scene and will use it as an emission object.

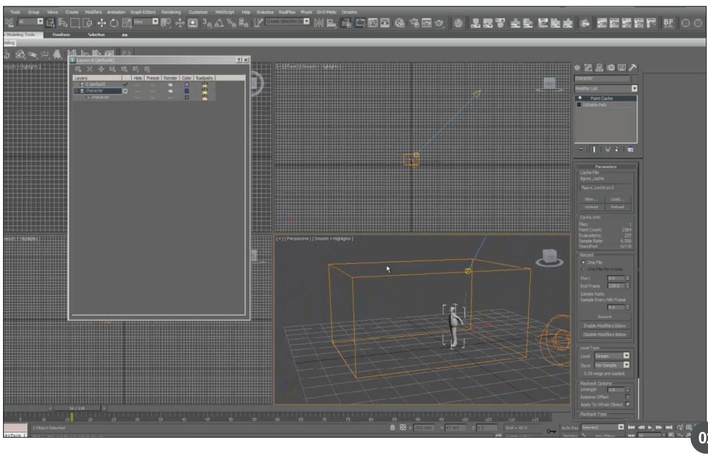
Before we hit the Simulate button, go to the Sim tab in the FumeFX GUI and bring down/adjust the Maximum Iterations spinner to something like 90. The default is 200 and its good practice to bring this down for testing and even for final simulations to optimize simulation times. Also move the Quality spinner to 6. Almost all


01

FumeFX scenes I’ve worked on/developed never have a quality value above 6 or 7.

Since FumeFX can simulate fire and smoke, in this case we want to turn off the fire visibility and fuel emission that drive the fire. We will cover fire simulation and effects in a later tutorial. Disable the fire by unchecking the Simulate Fuel checkbox under the Fuel tab. Just to keep things clean, under the Rendering tab, uncheck the Fire checkbox also. There is now no fuel being emitted into the scene to establish a fire, and even if there was it wouldn’t appear in the preview window or renders.

**Tip:** To get faster simulations and previews remember to increase the spacing value of the fume grid; the lower the number, the finer the simulation and therefore the longer the simulation times. Hit the Simulate button and let the default values of fume simulate out for a few frames (**Fig.03**).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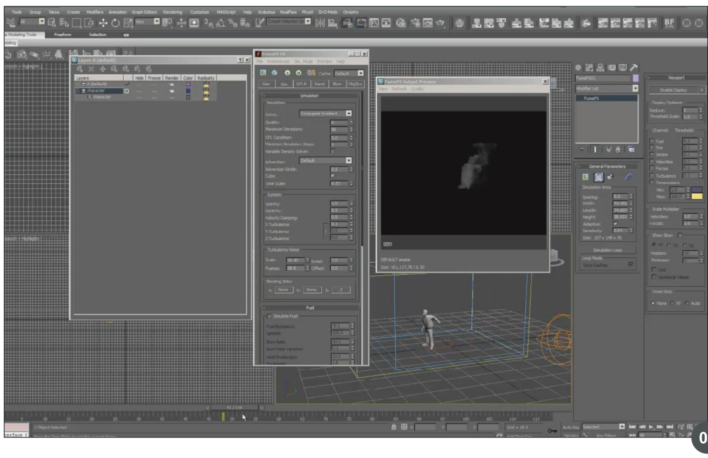
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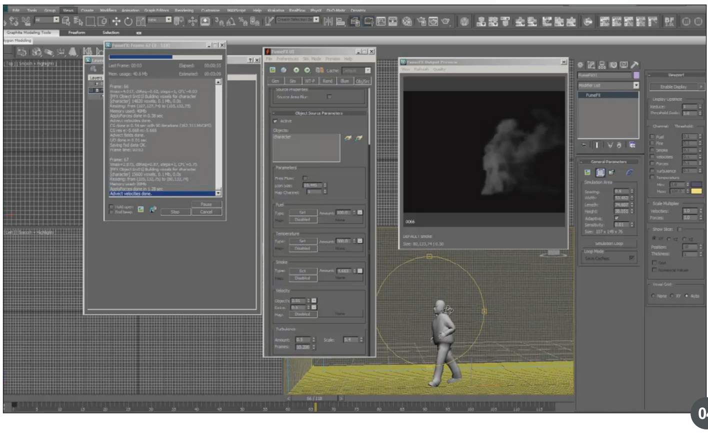
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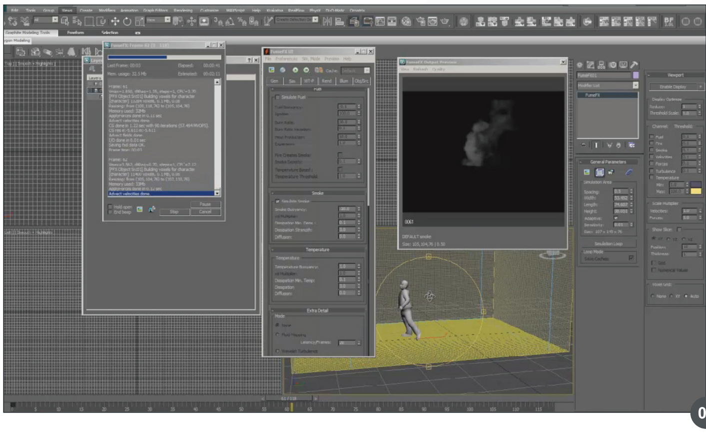
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Inside the FumeFX preview window you can see the character mesh emitting smoke from its surface, and the smoke is rising rapidly due to a combination of the temperature values, buoyancy and gravity settings.

If you can't see much detail in the preview, try lowering the spacing value back down slightly and re-simulating for a clearer result.

Let's address the smoke rising too fast and try to get it to trail behind the character more, as well as fall to the ground and roll about.

Under the Sim tab there is a section called Blocking Sides. Select the Z axis and set it to –Z. This means that any smoke that has been emitted within the container and meets the bottom will collide and move across the ground (**Fig.04**).

Let's lower the timescale value down from the default of 1 to something like 0.6. This will help slow the smoke movement and make the simulation appear larger. We can also add more velocity influence from the character mesh by going to the Obj/Src tab and, under the Velocity menu, increase the object's velocity value to something above the default value of 1. This means the character's body movements will push the smoke around more forcefully; similar to what happens when you wave your hand through a cloud of smoke.

Re-simulate and look at the results. The smoke is behaving more interestingly, but is still rising too fast. There are various ways to address this and control the smoke. Let's try changing the Smoke Buoyancy to something like -20.

Now when you re-simulate the smoke still rises, but it's not as buoyant and leaves more of a trail that lingers behind the character. Some of the smoke also now falls around the character's feet and interacts with the ground that we setup earlier by setting the –Z on the fume grid.

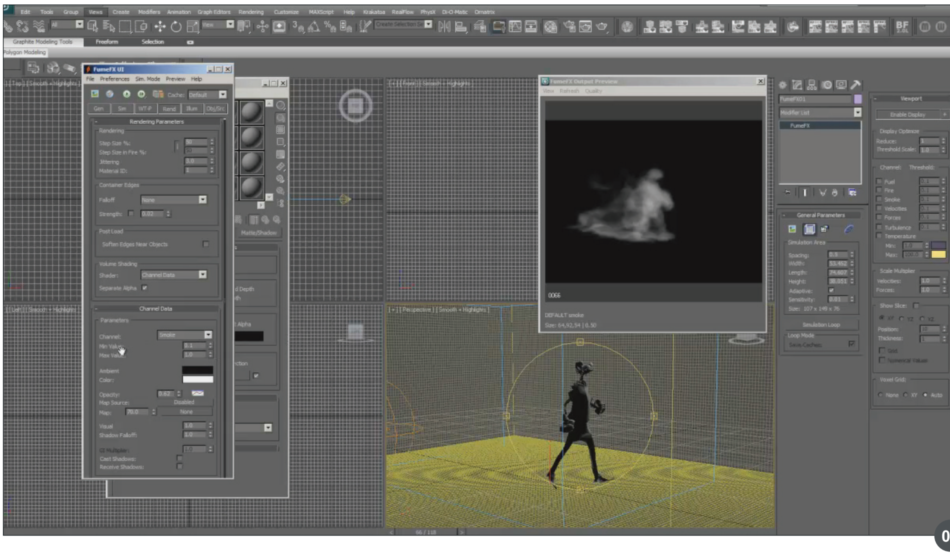
**Tip:** Try adding a Gravity Vector helper from the FumeFX helpers and adding it to the Obj/Src menu within Fume. You can force the gravity direction with this helper to get the smoke to travel in a desired direction (**Fig.05**).

One thing you may notice when using a mesh/object as a smoke emission source is that the smoke is emitted from the surface/normal of the mesh. This can result in what looks like a void or empty space inside the smoke in the shape of our character. Perhaps this is what you want as it may be required in certain cases, but in this example we won't be rendering the actual mesh and just want a smoky figure.

A simple way to help eliminate this problem is to edit the mesh object. Select the character mesh, apply a Push modifier and set a small minus value. This modifier pushes or pulls the mesh along its normal and so setting a minus value causes some weird/ugly areas on the mesh as surfaces intersect with each other.

In this case, this is no problem as we will not be rendering the mesh. Re-simulate again and examine the results (**Fig.06**).

We can still recognize a character's form, but since the normals of the mesh are now intersecting, and somewhat noisy, the smoke emission is much more random and we get a much better result.

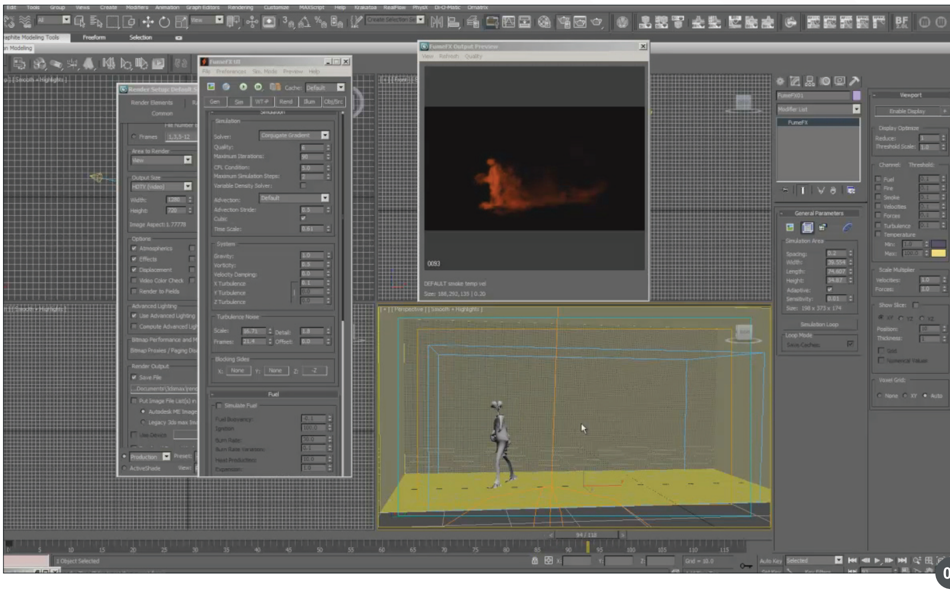

06

We are almost ready to run a final simulation, so after you are happy with tweaking other values within Fume and even animating them (I talk about this and adjust some turbulence values in the video tutorial), lower the spacing value to something like 0.3 and hit Simulate.

The more powerful your machine/hardware the faster FumeFX will operate. I'm using an 8 core I7 with 16g RAM and this scene takes around 10 minutes to solve at a low spacing value.

**Tip:** In the video tutorial, I go over various options for rendering the smoke such as using temperature and velocity channels for different looks from the same simulation.

Finally let's look at the rendering settings for our smoky character. Under the Rendering tab, in the Fume GUI, there is a Smoke Color box where we can set a single color or a gradient. Try playing with the color tab to find something suitable for your project and also try playing with the opacity curve. Adding points to this and setting unusual curve shapes can get some cool results for the appearance of the smoke. I selected a dark red color to render out, which you can see at the end of the video tutorial (**Fig.07**).



07

Before a final render, we need to add light/lights to the scene and add these to the Fume UI so it knows how to light the smoke. Create a standard spot light and position it appropriately in your scene. On the spot light parameters, we must enable Shadows and select Raytraced. Scroll down and under Shadow Parameters tick the Atmosphere Shadows On checkbox. This is an important step, as the Fume shader is considered an atmospheric effect and shadows won't be calculated unless this is enabled.

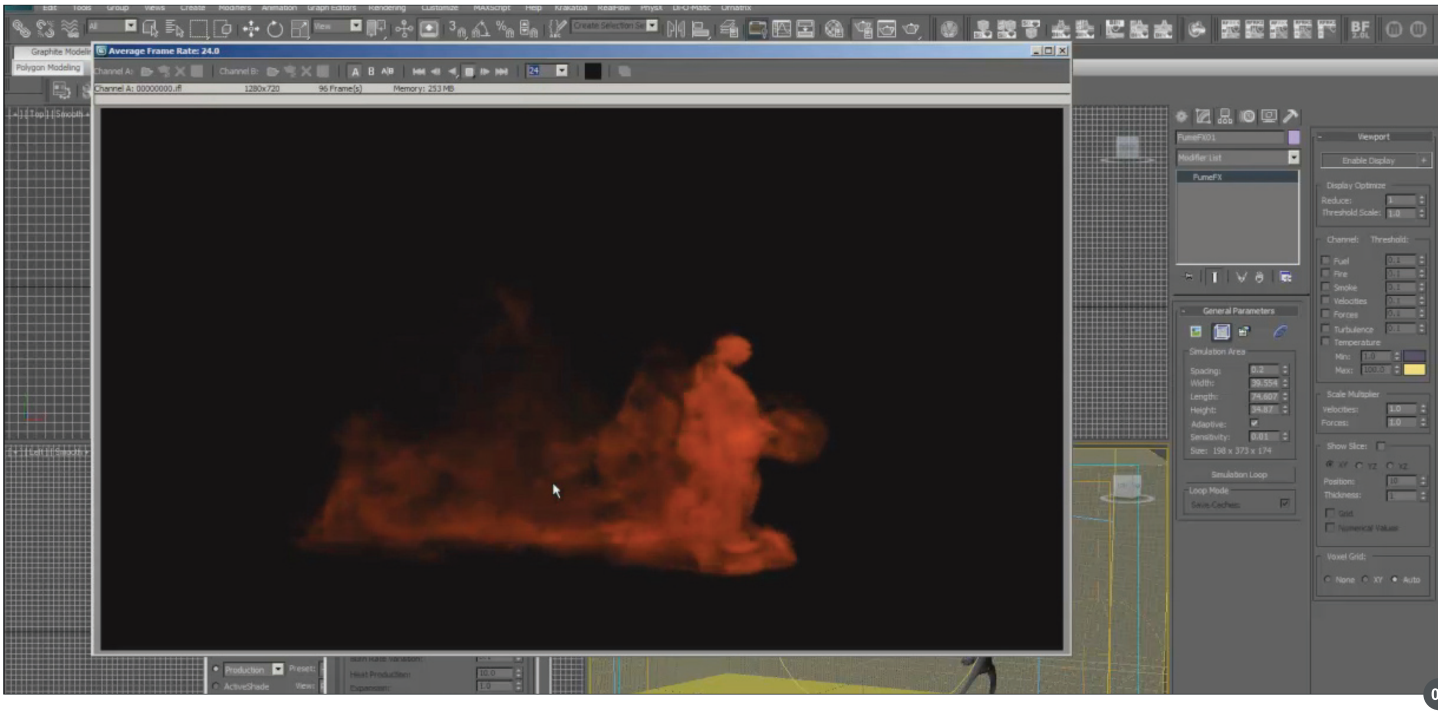
Finally we must add the spot light to the FumeFX Illum tab. Add the light with the Add button, then go back to the Rendering tab and enable the Shadow checkboxes for receive and send shadows. Now you are all set for a render. Refer to the end of the video tutorial to see the results (**Fig.08**).

I hope you enjoyed generating a smoky character and can apply it to your own projects and ideas.

## Matt Chandler

Web: www.angry-pixel.co.uk

Email: matt@angry-pixel.co.uk



08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03
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# GUIDE TO FX - PARTICLES & DYNAMICS

*3DCreative* are branching out from creating stills in this amazing tutorial series, which will be looking at how to set up FX and particle systems in 3ds Max and Maya. Our amazingly talented artists will tackle some of the most common and popular effects, and will show us how to set them up and manipulate them to match an environment of your choice.

## CHAPTER 02 SMOKE

# CHAPTER 02 – SMOKE

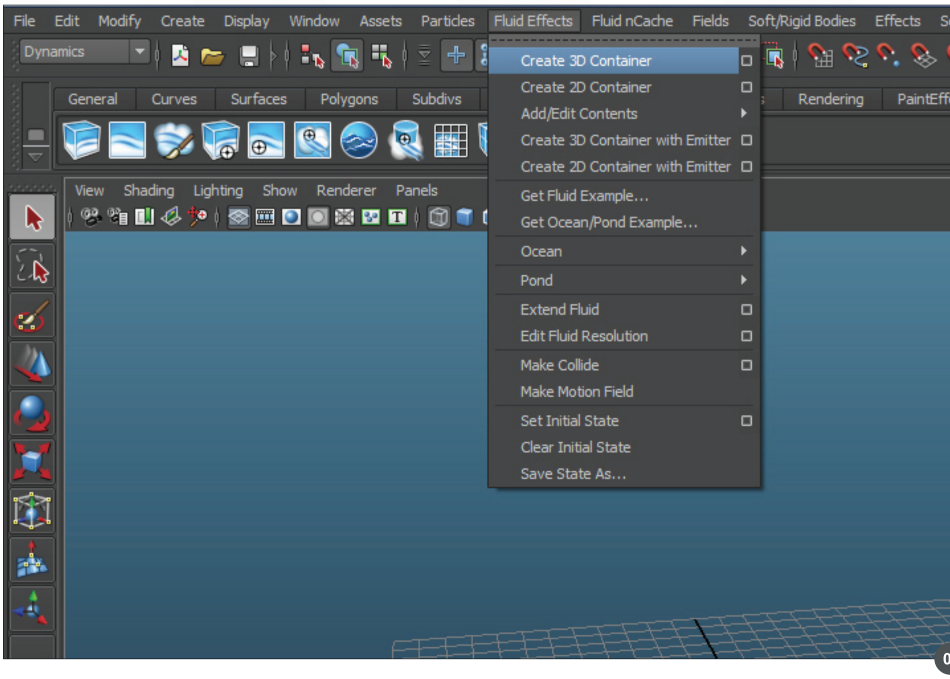
Software used: Maya

For this smoke tutorial, I am going to show you how to make thick, black, rolling smoke. The kind of smoke that comes from burning oil or a car that is on fire.

In the previous tutorial about water, I talked about the importance of modeling everything to real-life scale. For smoke, you can forget all about that; there is even an example file that comes with Maya where a nuclear explosion happens in a 10cm container!

If I need to match the scale of a scene, I will copy everything I need into a new scene and scale it all down to the size of the grid. Then when the simulation is cached, I will import my fluid container into the original scene and scale it up to match.

The first thing you will need to do is create a 3D fluid container. In the Dynamics menu set, under Fluid Effects, select Create 3D Container (**Fig.01**). Do not pick 3D Container with Emitter, because we will be creating our own emitter using geometry. The default size of 10 x 10 x 10 will work fine for now.

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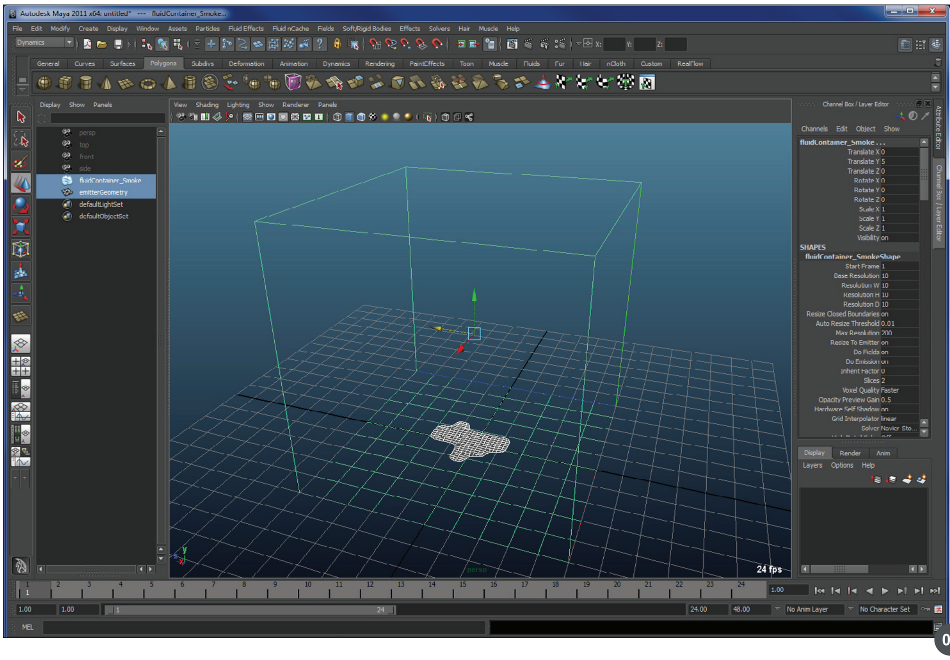
Create a piece of geometry inside of the container that you want to emit the smoke. Oil will spread itself thinly over the surface it is on, so I make an irregularly shaped flat plane (**Fig.02**). Make sure your geometry is within the boundaries of the container.



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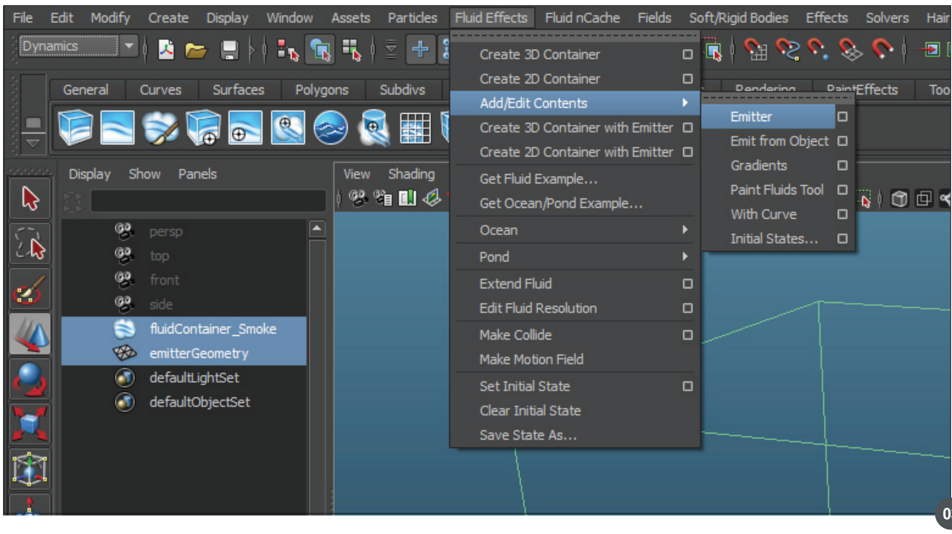
With both the geometry and fluid container selected, in the same menu as before, go to Add\Edit Contents > Emit from Object (**Fig.03**). This will add a fluid emitter node to your scene, parented to the emitter geometry.

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If you play back your scene, you should see some very low res, white smoke lifting off of your geometry (**Fig.04**).

In the Attribute Editor for your emitter, you can set all of your emission properties. I know that I am going to be using fire turbulence to break up the initial smoke emission, so I make the heat and fuel double what the smoke emission is. I usually start with 2, 4, 4, 2 (**Fig.05**). This is also where you can set the fluid color, if you wanted to do dynamic colors. That way you could have different emitters emit different colors of smoke and have them mix together. For this example the smoke will be one color.

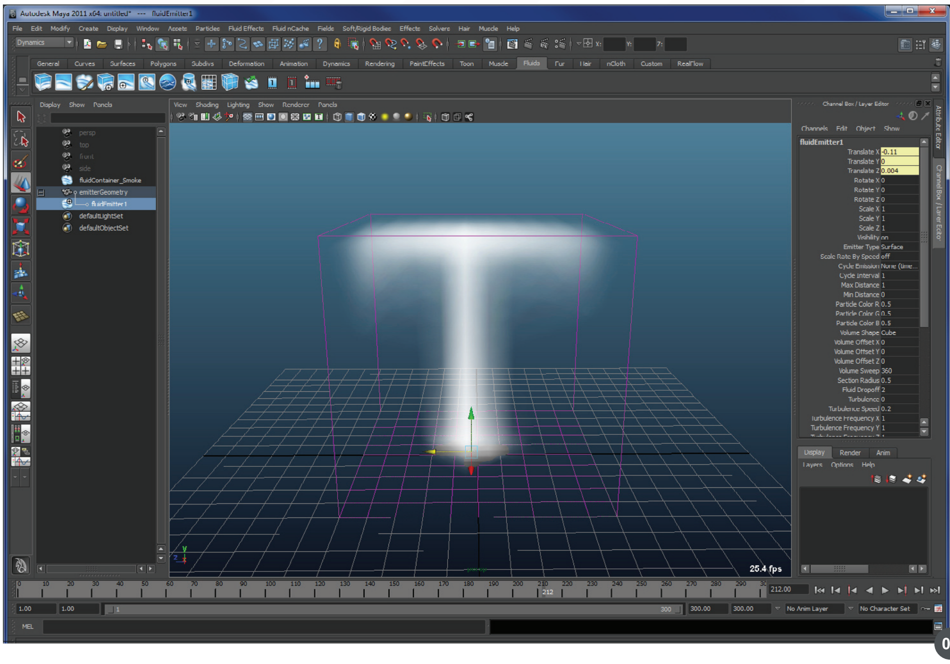
Now that the emitter is set, we can make changes to the fluid shape. The fluid shape has so many attributes that there is no way to cover them all. I will cover what is needed for this exercise, but I recommend that you play around with all the settings to see what happens.

In Container Properties, make sure Keep Voxels Square is selected, so when you adjust the base resolution, you increase the resolution in all axes at the same time. You can break down a 2D image into small squares called pixels; a 3D container gets broken down into tiny cubes called voxels or volumetric pixels.

Keep in mind that the more voxels you have, the slower the simulations will become. For now I set it to 40 so I can get a better idea of the shape, while still keeping the simulations fast. I also set the boundaries to None, -Y, and None. This will let fluid escape out of all the container boundaries, except the floor.

Under Contents Method, make sure to turn temperature and fuel to Dynamic. We want to use them to create some turbulence and create natural movement from the smoke. This is also where you would set the color method to Dynamic if you wanted to mix colors (**Fig.06**).

Under Dynamic Simulation, set High Detail Solve to All Grids. This will slow down the simulation, but will help with keeping detail in the fluid by reducing density diffusion. The Substeps can stay at 1 for now, but if your simulations



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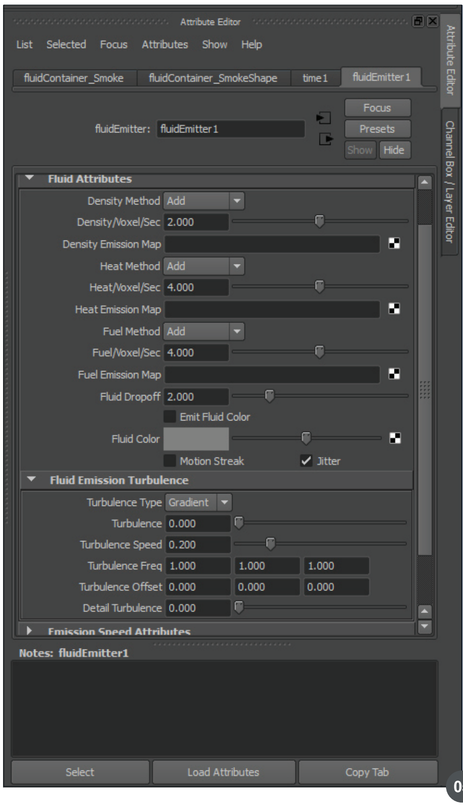


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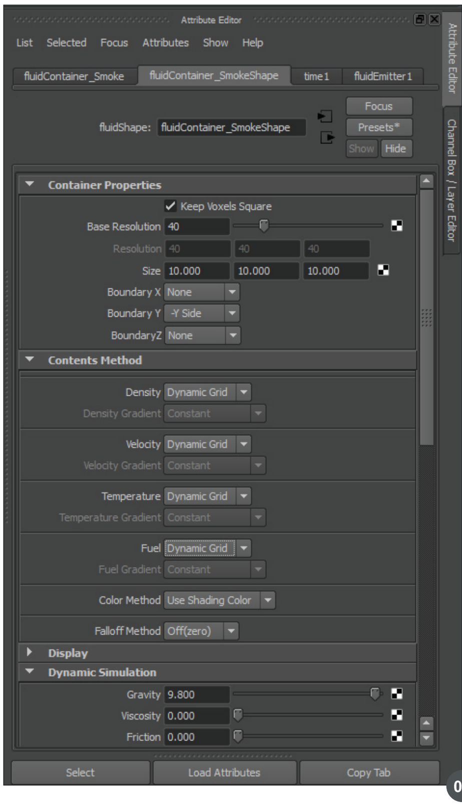


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become unstable, where the fluids explode or move too fast, it can be turned up.

Solver Quality deals with the compressibility of the fluids. Higher is more realistic, but causes slower simulations. You can also set it low and play around with self-attraction to get some cool effects. For now I'll leave it at 20. I will leave the Simulation Rate Scale at 1 and change it later after I see what it looks like.

Auto Resize can be useful early on as it makes the beginning of the simulation much faster, but it should be turned off for the final simulation because it won't calculate wind properly (**Fig.07**).

Content Details are where most of the forces that shape the simulation will come from. I am going to skip them for now and come back to them after completing a few more things.

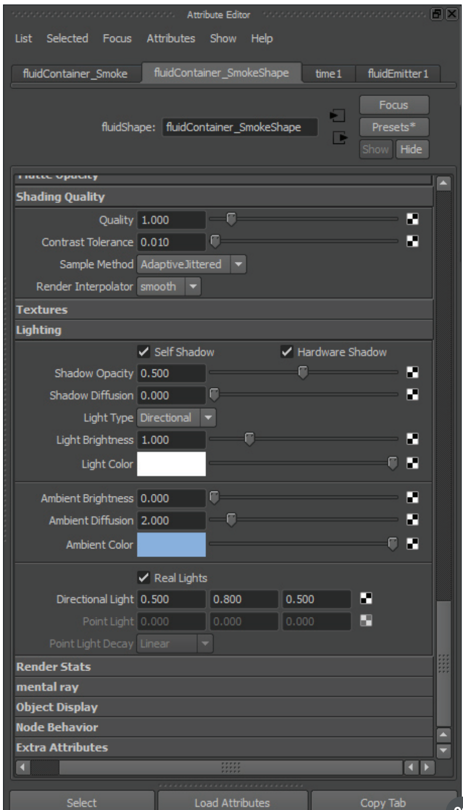
Set the transparency to almost black on Shading, as our smoke is going to be very thick and dark. I set all three channels to .02 on a scale of 0 to 1 and set the color to a dark gray. I will leave the incandescence on, so I can see how the fire influences the smoke, but I will turn it off for the final render (**Fig.08**).

Under Shading Quality, set the Render Interpolation to smooth instead of linear. This will smooth out the voxels, so that you don't see a grid pattern on the edges.

Under Lighting, turn on Self Shadow. You can adjust the light settings to change the look of the fluid. Also, make sure that Real Lights is checked if you want to use scene lights. The viewport display will still show shadows from the built-in lighting, but your scene lights will work properly in the render (**Fig.09**).

The controls for the dynamic grids we enabled earlier are back in Content Details.

For density, I drop Buoyancy to .5 because smoke itself isn't buoyant; it's the temperature that makes it buoyant. For thick oil smoke, Diffusion and Dissipation will remain at 0. If turned up, Dissipation will control how fast the density values will fall to zero and Diffusion controls how much it blurs into surrounding voxels.



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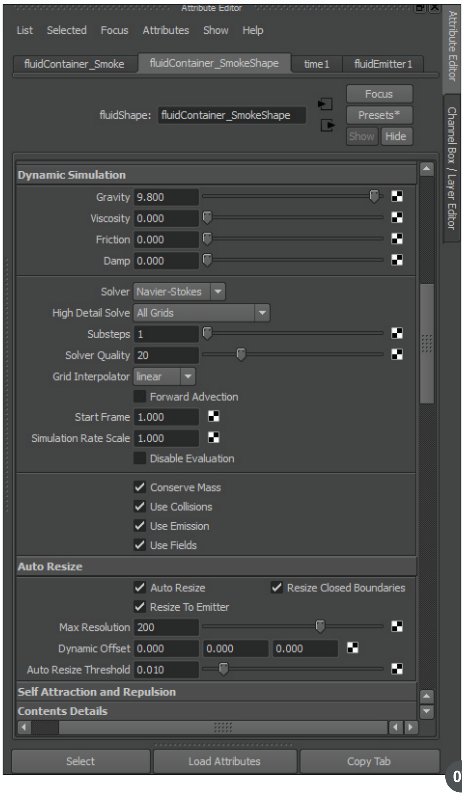

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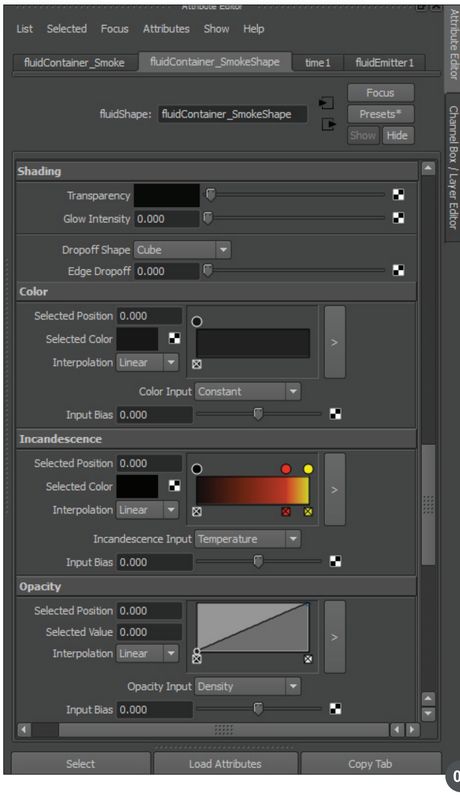
For Velocity, I set Swirl to 6.5, which will help the smoke form small eddies, but can also lead to instability if set too high. I am leaving Turbulence Strength at 0 because I want it to come from the temperature. For Temperature, I turn Buoyancy up to 4 and Dissipation to 3.5 so that the heat will rise quickly and then die off. I set Turbulence to 3, but at this resolution it is hard to notice a difference.



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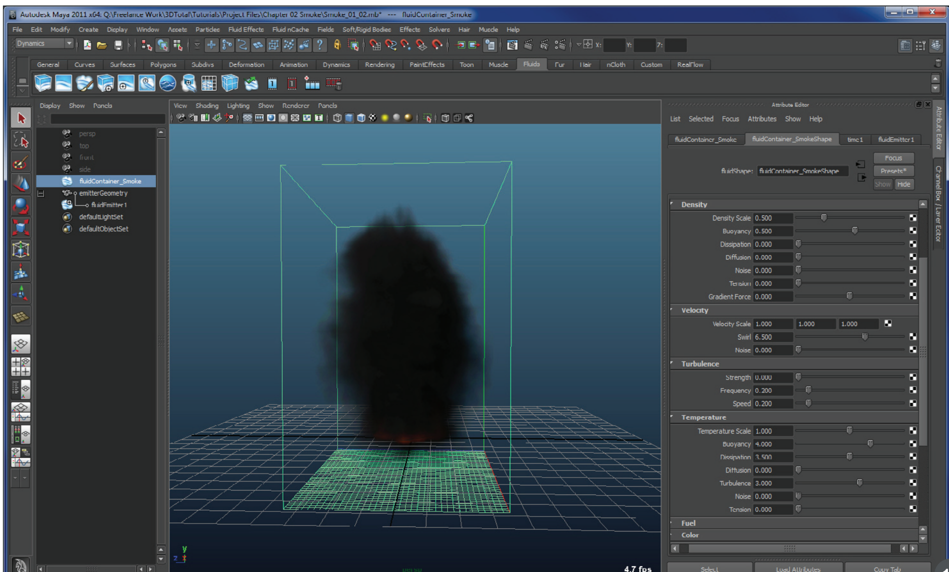
Setting all of these values is very interactive. I am constantly playing the simulation back and changing numbers until I get something I like. I could set up the exact same simulation and come up with different numbers. After doing this enough times, you will be able to recognize what will look good at a higher resolution (**Fig.10**).



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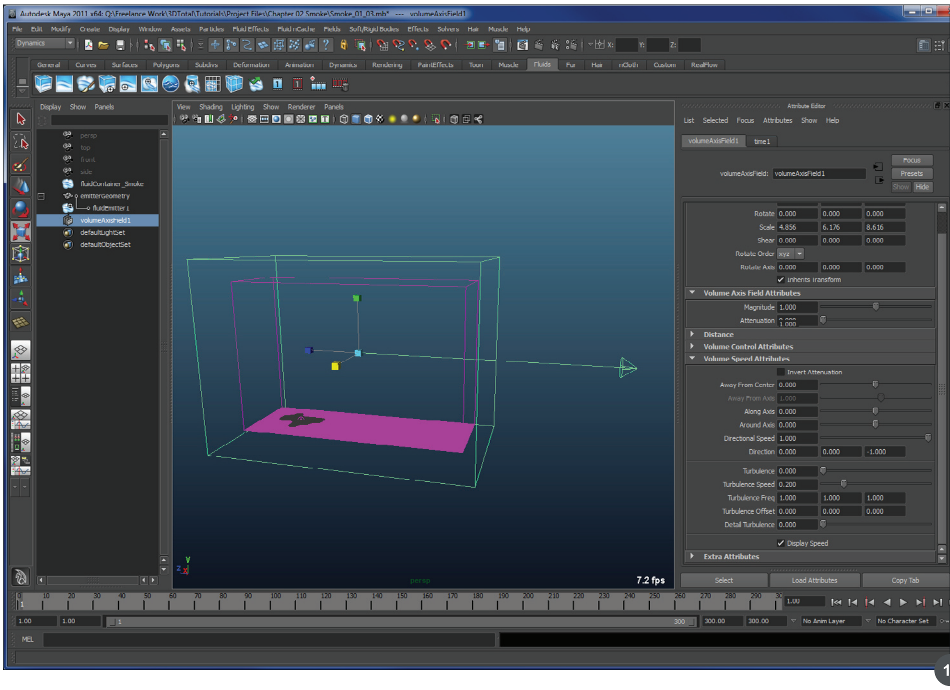
I am now at the point where I will need to turn up the resolution and make small adjustments. I turn up the base resolution to 200 and play it back.



Overall it looks pretty good. I would like it to move a bit faster and add some wind that blows it to the side. There are also some issues: the auto resize is stopping the smoke from expanding as much as it should.

Change the simulation rate to 1.75, turn off auto resize, and change the container size to 5 x 15 x 25 to give some room for the wind to blow. With the fluid container selected in the Fields menu, add a volume axis. Set the magnitude to 1. Turn down all of the speed attributes, apart from Directional Speed, which you need to set to 1. Direction can be wherever you want; in this case along the -Z axis. Then make it big enough to surround your container (**Fig.11**).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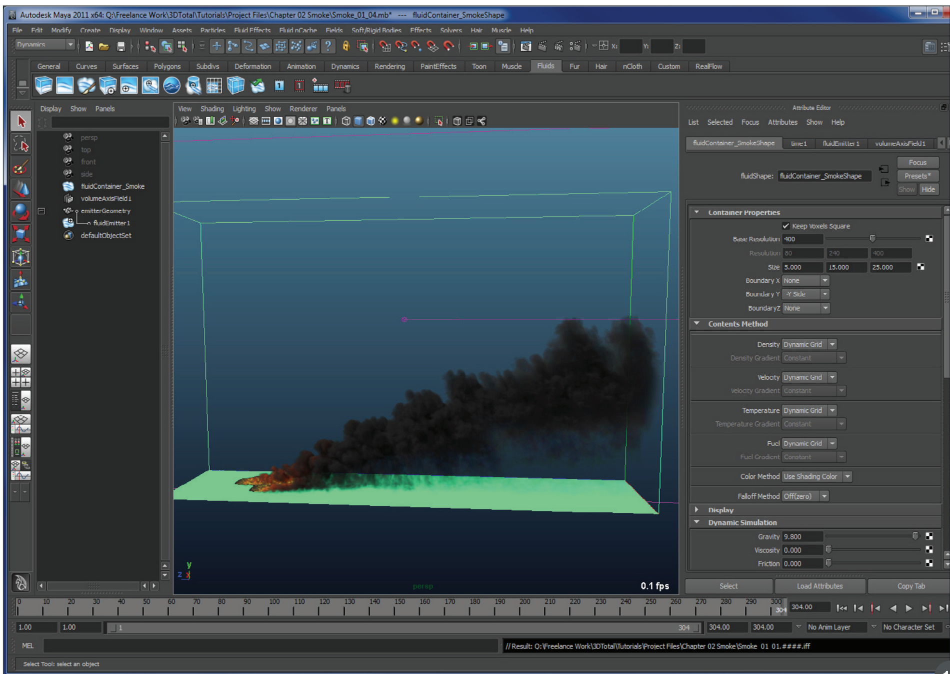
I turn down the resolution temporarily, to make sure my Wind Magnitude is good, but notice that it keeps getting faster, until the smoke is going straight sideways along the floor. This is because without boundaries on the sides, the wind has no resistance and continues to get faster and faster. A solution for this is to add some dampening into the simulation. Under Dynamic Simulation, I change Damp to .02. I also drop my Wind Magnitude to .8 and my simulation looks pretty good at low res.

Now it is time to turn up the resolution to the final size. With a base resolution of 400, the total voxel count is 7.68 million. This will likely take a few hours to simulate, so I am going to cache it.

With your container selected, in the Fluid nCache menu, go into the options for Create Fluid Cache. Here you can set the directory for your cache, as well as which attributes to cache. Then hit Create (**Fig.12**).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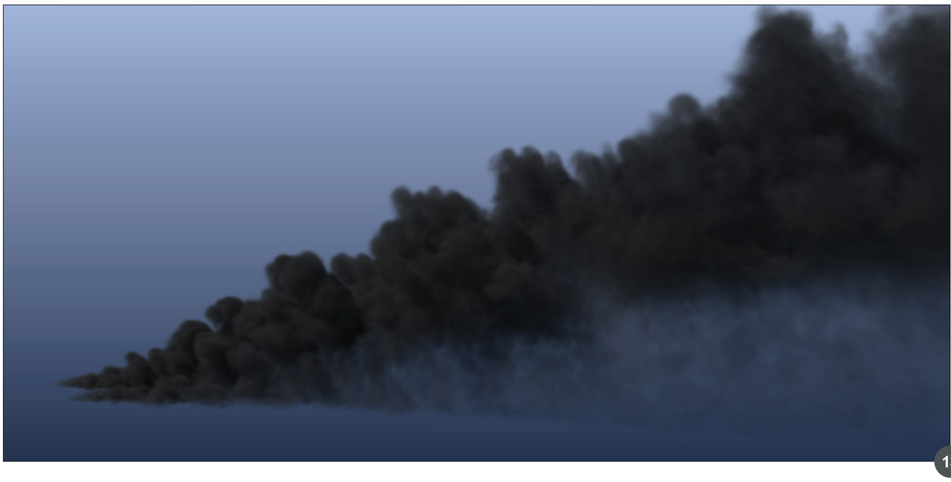
This took 2 hours 19 minutes to cache out 300 frames (this will depend on the power of your

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system) and is 51.6 GB. If I had to re-simulate for any reason, I could make my container a bit shorter to speed it up, but I am happy with how it turned out.

Now that the simulation is done, you can do some final adjustments to the shading. Under Shading > Incandescence you can remove all of the colors but black, to remove the fire from your smoke. If you would like to leave the fire, you can adjust the ramp here to change how it looks. Under Opacity, you can adjust the curve to change the look of the smoke quite drastically, but I find that the default curve works pretty well for thick, rolling smoke.

Also, now is the time to turn up the shading quality. Render out a few frames with different values to see how low you can get it while still keeping the detail you want. I ended up putting mine at 3.0.

Render times will increase significantly for each light you use in your scene. Usually, I try to get it to look good with one directional light. I do this by turning up the ambient brightness slightly.

When you set your render options, use the lowest settings. Preview for Maya Software Renderer or Draft for Mental Ray. Fluids will still look good and it will speed up the render times. The only time you need to turn up the settings, is if you have a matte object moving through the smoke and you need anti-aliased edges (**Fig.13**).

Mike Zugschwert
Web: http://www.mikezfx.com/
Email: mzugschwert@gmail.com

# BUILDING DROIDS

## MEDI DROID

Characters are, of course, a popular subject for CG artists. However in this series we will be approaching creating characters in a slightly different way. Each of our amazingly talented artists will be provided with a 2D concept and technical drawing of a cool, sci-fi droid. They will then show us how to turn this 2D information into an accurate and exciting 3D model. Many techniques and approaches will be used throughout the series, which will provide all of us with a great opportunity to develop our own 3D skills.

# CHAPTER 02 – MEDI DROID

Software used: 3ds Max

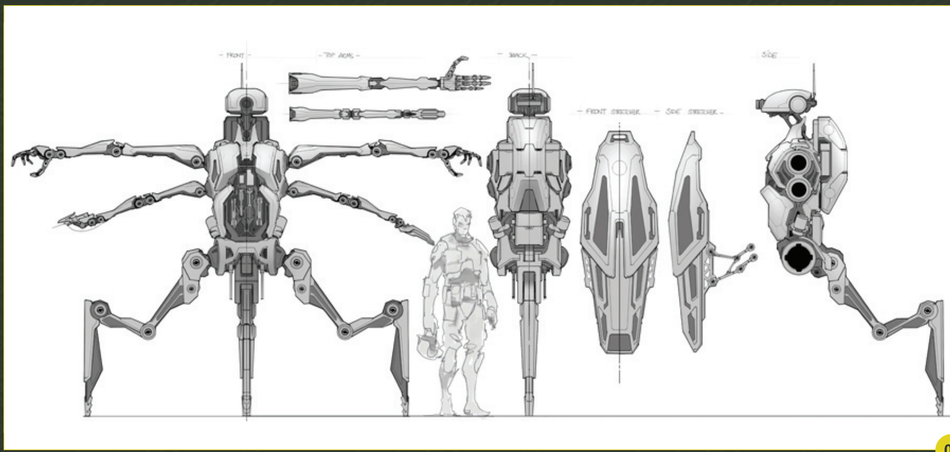
Hi, welcome to this tutorial about how to use blueprints to create a 3D droid in 3ds Max.

Initially, examine the material you have been supplied with. In this instance we have been given a set of orthographic drawings showing the front, side and rear of the main body. There is a lot of detail in the plans to study, so take your time to appreciate what is going on.

As it stands, all of the views are lined up and drawn in conjunction with each other, so there is no need to realign the plans. Sometimes when you get blueprints from the internet things are not scaled in relation to each other correctly (**Fig.01**).

An illustration of the android in action was also supplied, which helps you to understand how it functions and what its purpose is. The illustration also helps to provide additional information, which might not be clear on the blueprints. Presumably the illustration was produced before the blueprints, so the illustration of the medical android in the scene takes priority as far as what the model should look like. Obviously if you are told by the concept artist or client which to use as the primary resource, go for that (**Fig.02**).

In 3ds Max you automatically have four viewpoints set up so use this to your advantage. When you model something in the first plane 3ds Max will automatically place everything on a “0” axis. This is when you need to switch to an alternative view to move the vertices to the corresponding area (**Fig.03**).



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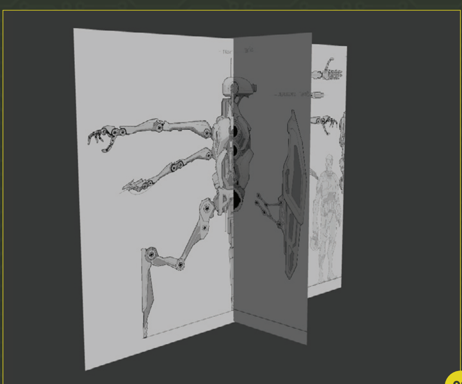

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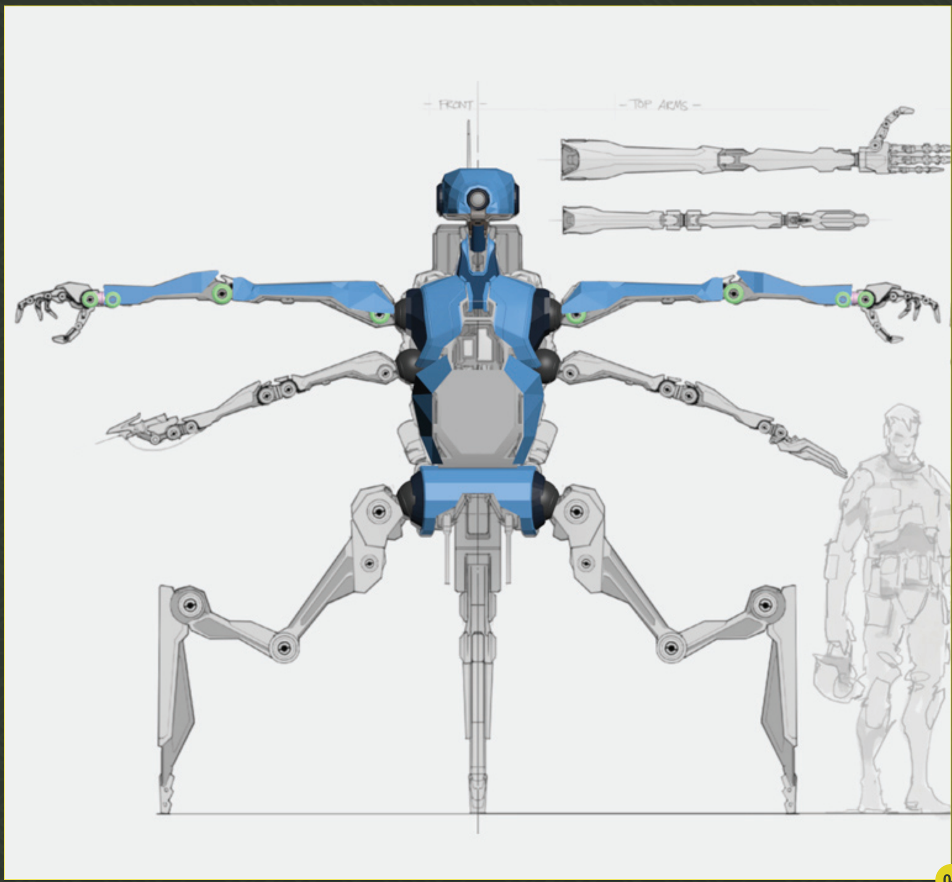
Try to pick obvious points on the model to line up in front and side view. When poly-modeling it is important to help keep a nice flow so it is easy to see how your model is shaping up. Don't forget to switch to Perspective view and spin round, just to check that the model is smooth and sharp in the places you want it to be. Pinching is always a big issue in poly-modeling.

There are many ways to model and my modeling techniques have been self-taught. One method, which I find helpful, is to block in several connecting parts to make sure everything is lined up and you have modeled everything correctly. Once this is done, start to add detail to the individual parts. With this method you don't need to worry about things not matching up (**Fig.04 – 05**).

The basic key to this process is to draw the outer shape of this joint with Splines and add Extrude modifiers to give it thickness to match the technical drawings that you have (**Fig.06 – 09**).



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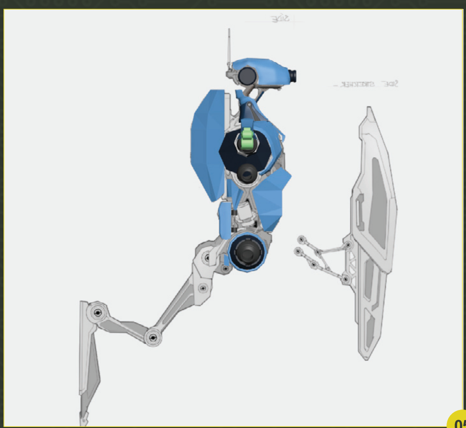
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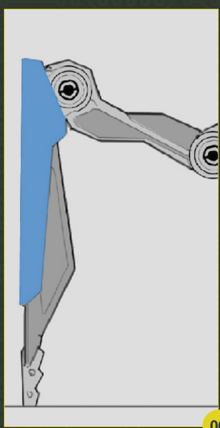
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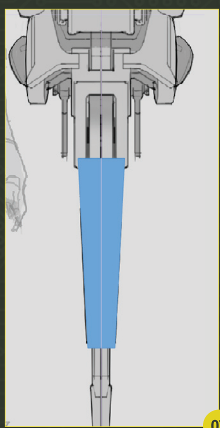
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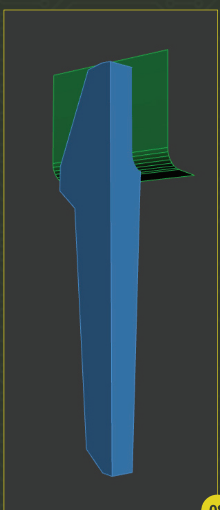
There is a recess in the leg that can be seen in the orthographic drawing and the final illustration. Parts like this are important to the design of things like droids as they provide interesting detail. To create this effect you need to draw the shape of the recess with a Spline by going to Create > Shape > Line (**Fig.10**).

Once the shape has been drawn out we are not going to extrude this time, but project this shape onto the extruded leg we have just created. You can do this by going to Shape Merge, which is part of the Compound options, clicking on the dropdown menu currently saying Geometry, and selecting Shape Merge.

This is the resulting mesh after you have selected the shape and the Spline for cutting. You will now need to right-click and convert to Edit Poly, or it will stay as a Shape Merge, which means you can't edit it (**Fig.11**).

Using the same theory as before, create the outer shape of the joint and extrude it to create the thickness of the leg. Draw the additional detail as a Spline, but instead of using Shape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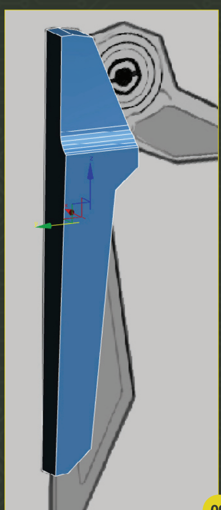
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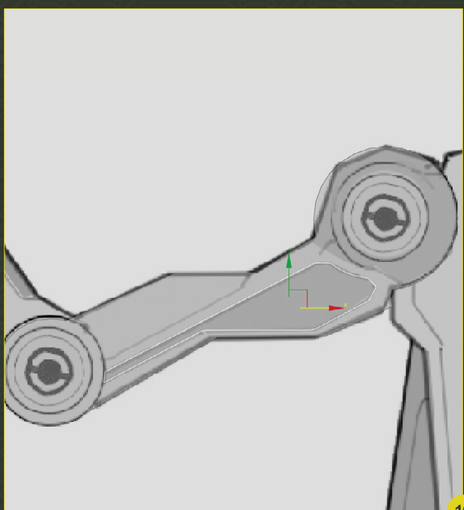
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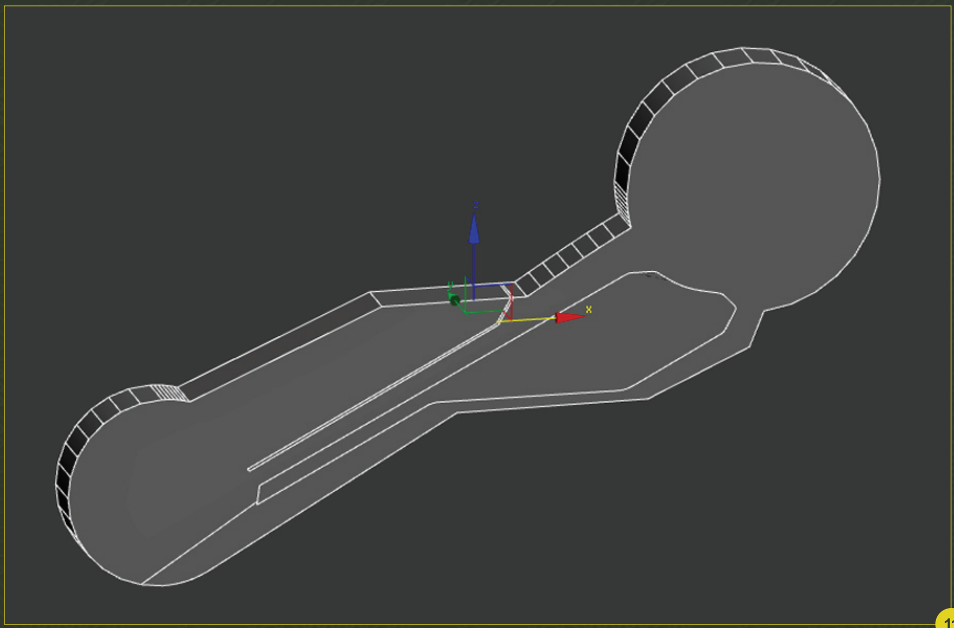
Merge to cut into the object, we are going to extrude the shape outwards. Before you do this, snap the Spline to the surface edge of the joint from the top view, then add a Extrude modifier.

This is a good example of where you can use the Instance tool in 3ds Max. Block in the shape of the part shown in red (**Fig.12**).



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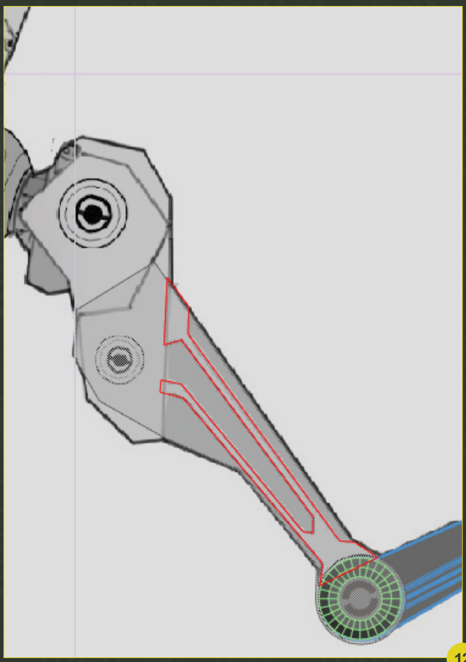

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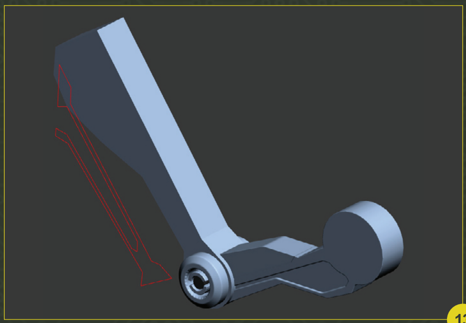

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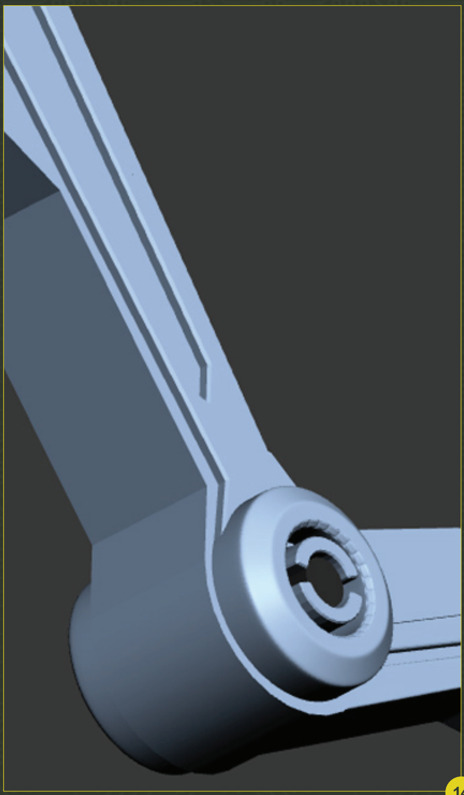

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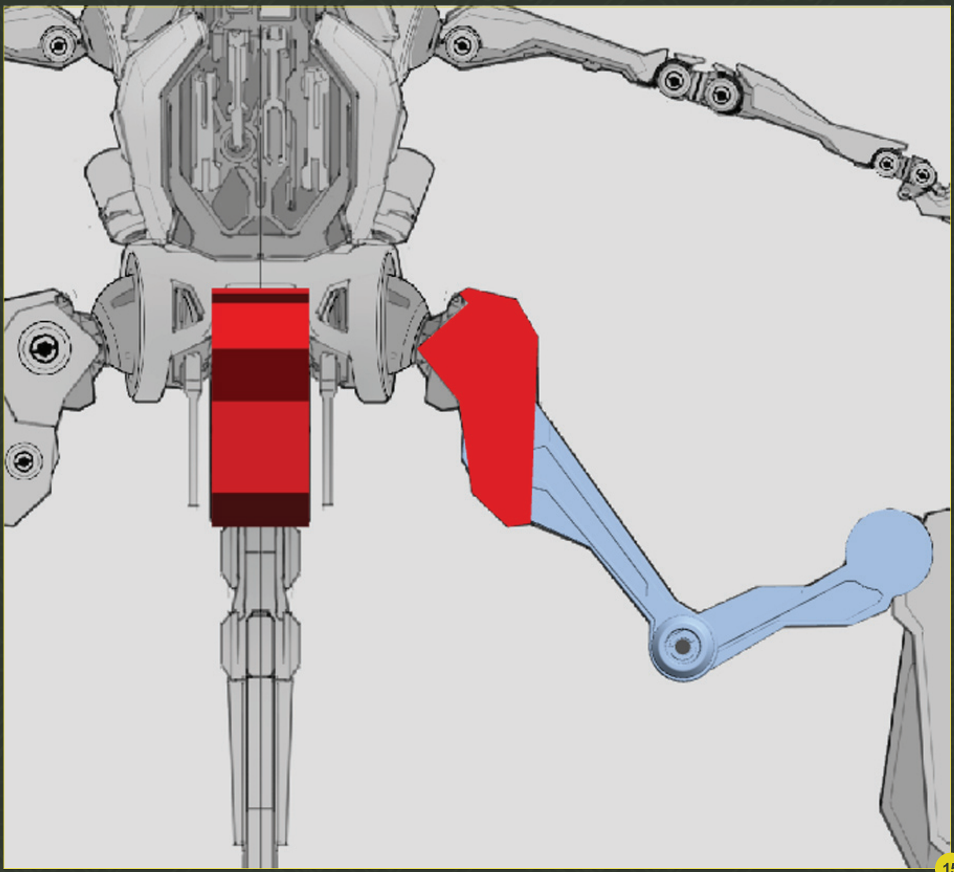

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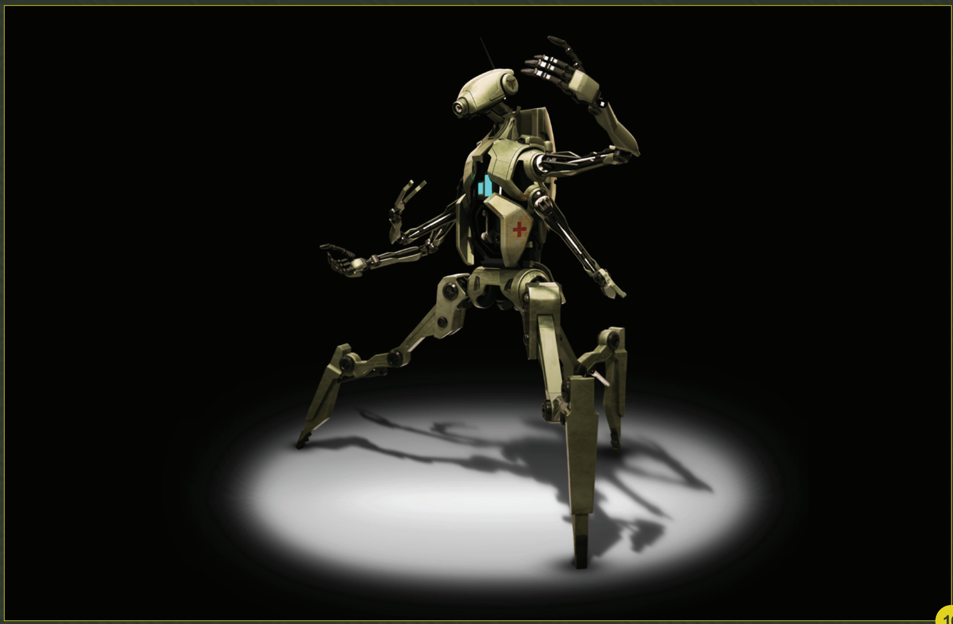
Shift-click and drag the object and instance it. This is a direct copy of the object and whatever you do to one will affect the other unless they are made unique at a later date (**Fig.13 – 14**).

Now we have to position the red leg section so we can see how it looks from the inside and side elevation view. If we view the rear viewport we can see how it matches up to the orthographies. In every view we need to model it correctly (**Fig.15**).

Now the initial stage of modeling is complete it is time to pose the character and add some lighting. 3ds Max offers Scanline and mental ray lighting, as well as third party renders. The aim here is not to get the android looking clean and pristine, but to make it look like it has come from a war-torn environment as the concept illustration did (**Fig.16**).

Have a think about where the android would be damaged and what sort of damage it would be. Be creative and add logic to your choices.

To see how this could look in an environment I added it to a photograph I sourced from https://www.moofe.com/#/homepage and adjusted the depth of field (**Fig.17**).



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Background provided by moofe.com

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You can see the final textured model in **Fig.18**. I hope you have been given a good insight into using blueprints with 3ds Max.


## Tarik Ali

Web: http://tarik-ali.co.uk/

Email: tarik3d@googlemail.com



# ARMORED BEASTS

ZBrush is a formidable piece of software that is capable of so much. The possibilities are endless and the only restriction is your imagination. In this series our artists will be flexing their creative muscles to show us how to create not only the organic forms of their beasts, but also the non-organic forms that make up their armor and weaponry. Follow the creation process from initial concept through to final illustration and find out how to create some mind-blowing armored beasts!

January Issue 077 Chapter 01 | Lizard    February Issue 078 Chapter 02 | Bear    March Issue 079 Chapter 03 | Chicken
April Issue 080 Chapter 04 | Gorilla    This Issue Chapter 05 | Rhino    Next Issue Chapter 06 | Cat

# Chapter 05 – Rhino

Software used: ZBrush

## Introduction

This tutorial will focus on the creation of an armored rhino. During the creation process I will make extensive use of the tools that were made available in ZBrush 4R2. Some of the features in this version of ZBrush make it possible to unleash the artist's creativity and makes it possible to do more with the lighting system. We will be taking advantage of all these goodies.

As a starting point I think it's important to have a character sketch, or at least a scribbled idea, as this keeps the process ordered and structured. The quality of the image doesn't matter too much as the aim at this stage is to set a goal and an objective that we want to aim for. You can see the concept for my image in **Fig.01**.

You will notice that a lot of things are already suggested in the sketch. The pose is set, the scenario is defined, the light direction is shown but, most importantly, the character's attitude and personality is set. So with the concept in place it is time to start.

## Body – Base

Open ZBrush, then select the Tool directory in Lightbox and double-click the PolySphere. ZTL option. Drag on the document to create the sphere and then press the Edit button to be able to start sculpting. In the Tool menu under Geometry, enable DynaMesh. A pop-up window will ask you if you would like to freeze subdivision levels; you should choose No. The sphere has now been converted to a DynaMesh, which is made up of regular quads projected from the X, Y and Z axis.

Press X to enable Symmetry. We will start by blocking the shape of the head (**Fig.02**). Choose the Move brush with a large draw size (press S and adjust the slider) and pull the front of the sphere to create an elongated snout. Also push the lateral sides inwards to make the head thinner.

Using the SnakeHook brush, pull up the geometry to create a horn in the appropriate place. Don't pull the whole horn at once; pull a bit at a time. By making the Polyframe visible (Shift + F), you can confirm that the geometry has undergone extreme stretching and the resulting surface is not good for sculpting. As we are in DynaMesh mode, press Ctrl and drag on the background. All the stretched areas will be recomputed with a uniform polygon distribution of the same density as the rest of the model.

You can repeat this procedure as many times as you need. Just take into account that every time you Remesh, some details that are smaller than the grid might get lost/attenuated. DynaMesh is not intended to be the final surface for the finer details; it is, in fact, a very powerful way to build your sculpting base, which can then be subdivided and sculpted the same as any other ZBrush model.

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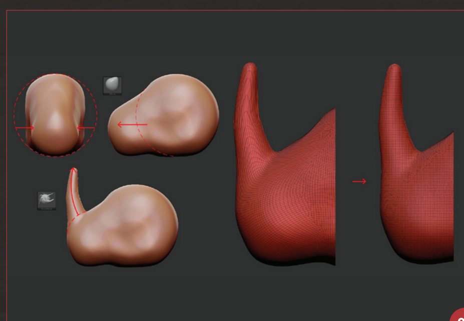

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In my opinion, the best brush for concept sculpting is the Clay Buildup brush. Its strokes create a rough look that is adequate at this point and helps you focus on the masses and planes rather than the details. By pressing Alt when applying the strokes it carves the surface. For Smoothing use the Shift key.

Start sculpting your model using the Clay Buildup brush. In the Brush menu, under Auto Masking, enable BackfaceMask. This means that the strokes do not to affect the opposite side of thin surfaces. In **Fig.03** you can see my sculpting sequence.

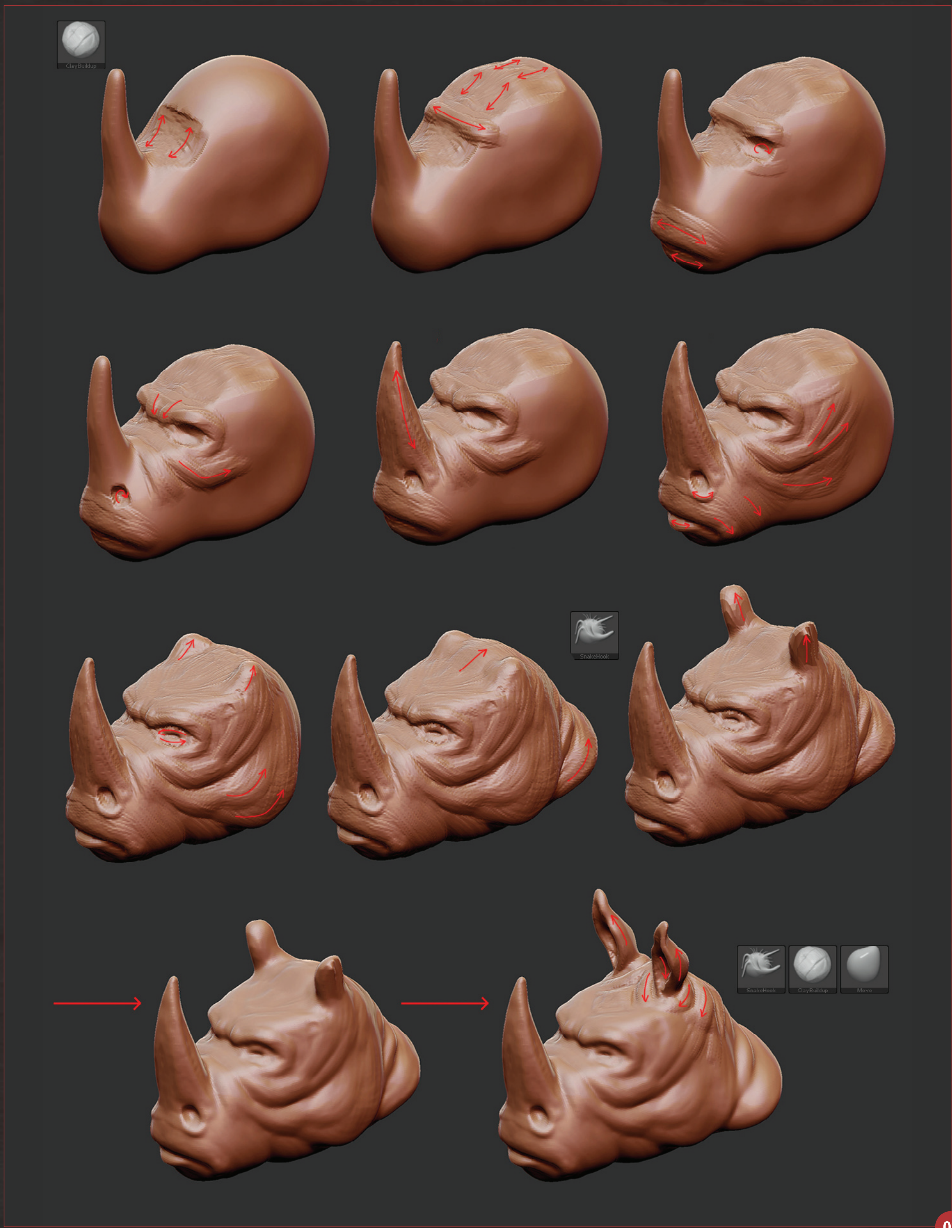
Start by carving the eye area, then add some volume to where the eyebrows would be and give more shape to the forehead. Continue to refine all of the facial details in this way.

At this point the basic form of the head should be established, so start to add some fleshy masses to the cheeks, lip corners, under lip and below the nostrils. Then start to add some ears.

Remesh the model by pressing Ctrl and dragging on the background. Notice how the surface gets smoother and the brush details are smoothed out and lost. This is not the right time to start sculpting tiny details, even if the sculpt is looking nice and smooth. Once this is done spend more time refining the ears and pulling them out further.

You can see how I added the body mass in **Fig.04**. Select the InsertSphere brush and click and drag at the base of the neck at the symmetry line. Make sure to create a big sphere, which will cover the head. With the Move brush, shape the sphere into a blob that connects with the head at the neck and suggests a belly at the front.

Using the Clay brush, start defining the muscle groups on the body (**Fig.05**). You should use references if you need help doing this. Create the pectorals by stroking from the center of the



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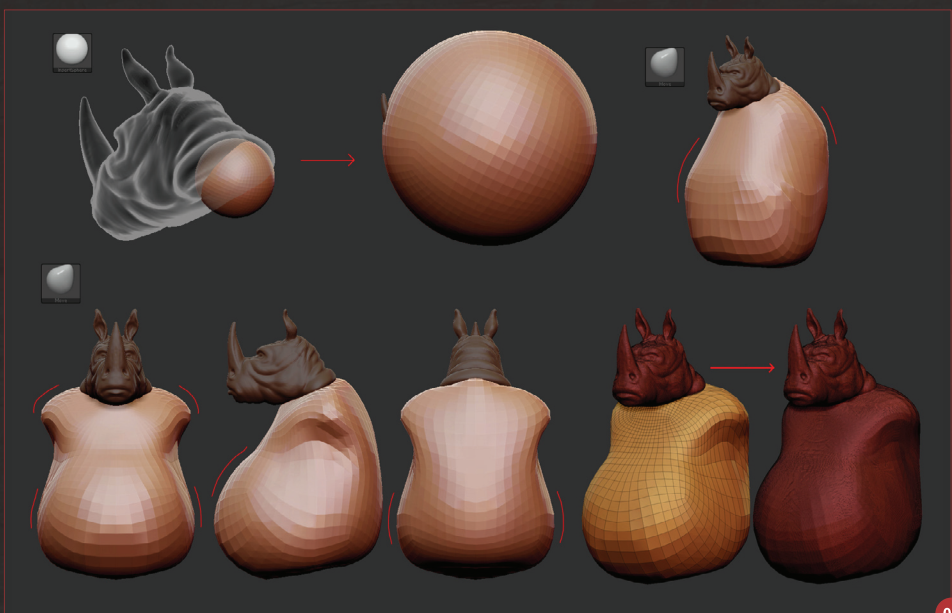

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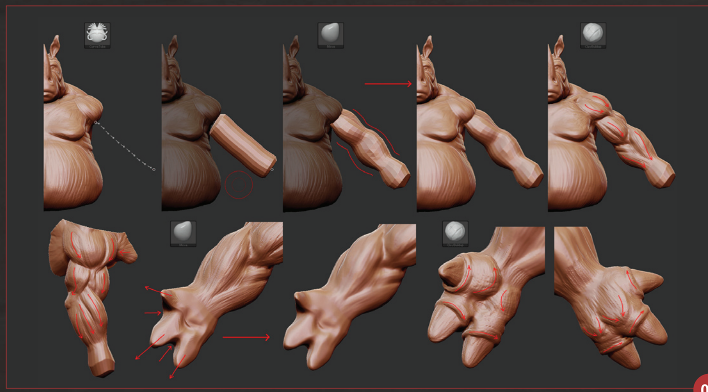
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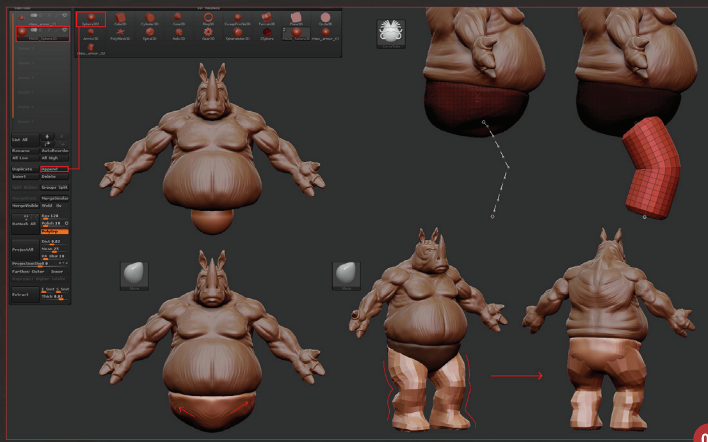
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chest to the shoulder area. Always apply brush strokes in the direction of the muscle fibers.

To create the arms, select the Curve Tube brush (**Fig.06**). In front view, apply a brush stroke the length of the arm, starting at the armpit and moving away at a 45 degree angle. Bear in mind that the thickness of the tube is determined by the size of the brush. Using the Move brush, shape the tube into the form of a basic arm in which the arm, forearm and hand are distinguishable.

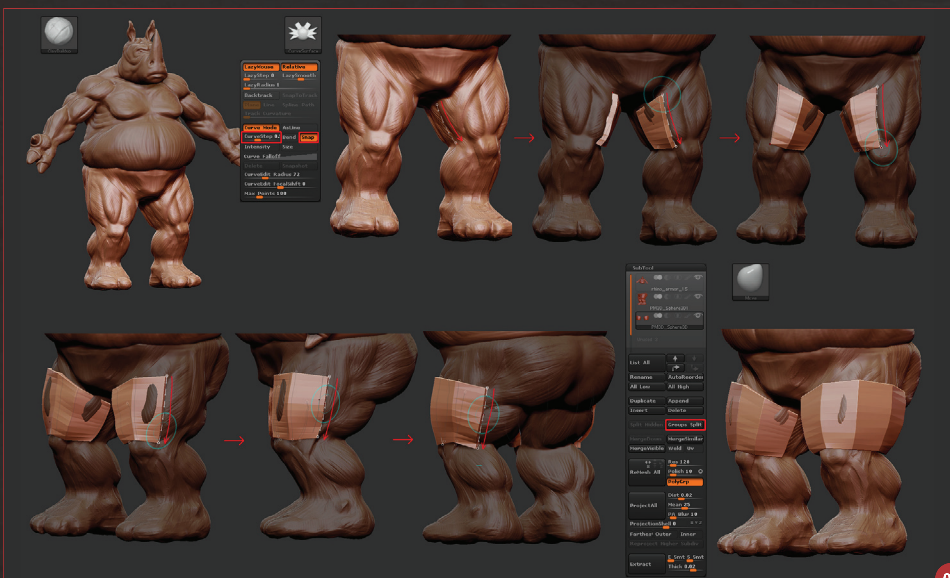
With the Move brush, pull a thumb and two fingers out of the hand, and press Ctrl and drag to remesh the model. Choose the Clay Buildup brush and create a height difference between the fingers and nails. Carve the palm of the hand and sculpt the larger volumes to make the surface more believable. On the top of the hand define two knuckles and a flat back of the hand.

It is now time to create a base for the lower body (**Fig.07**). As this body part will be covered in armor I opted to create it as a separate subtool. In the Tool menu, under Subtool, choose Append and pick the Sphere3D tool. Turn on Symmetry by pressing X and Move it to place it under the waistline. With the Move tool, stretch the sphere to create a diaper shape. Enable DynaMesh, choose the CurveTube brush and create a tube starting at the hip with a curve at the knee area. Use the Move brush to shape the legs to roughly define the thighs, lower legs and feet. Press Ctrl and drag on the background to clear the mask, then again to remesh, fusing the pelvis with the legs.

With the Clay Buildup brush I sculpted the muscles roughly on the legs so I knew where to place the armor (**Fig.08**).

## Armor – Base

To create the base of the leg armor, choose the Curve Surface brush. This brush allows you to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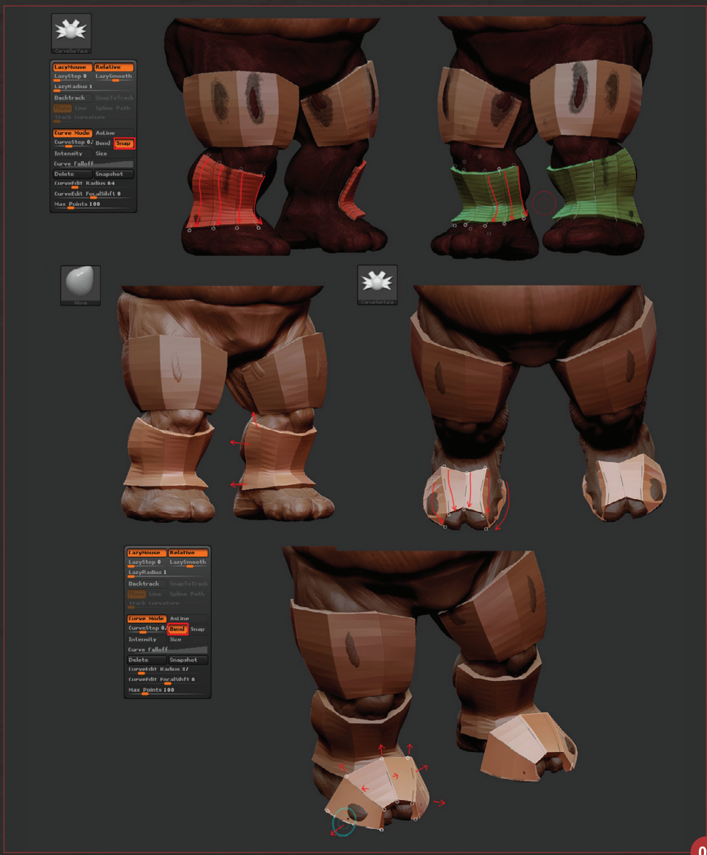

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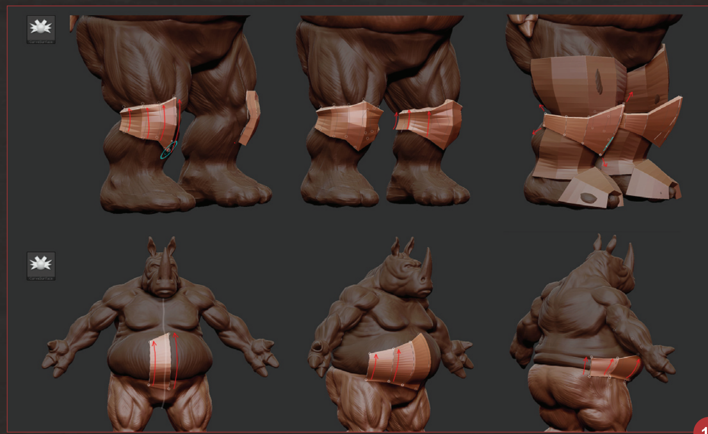

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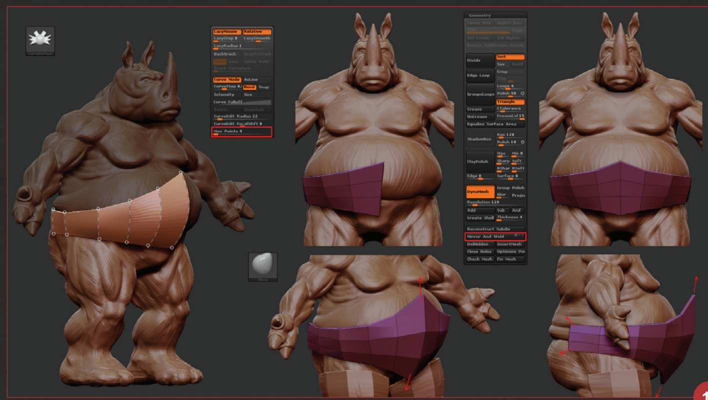


11

create several curves, which will be connected by a surface. Select the brush and, in the Stroke menu, enable Snap mode so that the curves stick to the surface when they are drawn. The Draw Size of the brush will define the thickness of the surface and the CurveStep in the Stroke menu defines the distance between points in a curve.

The remaining leg armor will be created using the same procedure. Select the legs subtool and create vertical curves around the shin area with the Curve Surface brush (**Fig.09**).

To create the knee armor (**Fig.10**), turn on Snap mode for the Curve Surface brush. Hide the leg

12

armor parts and create vertical curves around the knee, keeping them short at the sides of the knee and long at the center of the knee. Unhide the leg armor and turn off Snap mode to manipulate the curves and make them cleaner, and so that the surface covers the shin and leg armor pieces. Also create an aggressive spike at the top of the knee armor.

For the belly protection start by hiding everything except the upper and lower body subtools. The Curve Surface brush doesn't allow you to create a single curve starting at the center that is symmetrical on both sides. Choose the upper body subtool, disable Symmetry by pressing X and enable Snap mode. Once you have done that draw the first curve to the right of the center of the body. Then keep drawing curves around the belly until you reach the other side.

To adjust the belly armor curves disable Snap and move each curve point to make each section perfectly round (**Fig.11**). You may notice that I used too many points for each curve, which might be a problem later as the surface has a lot of horizontal subdivisions compared to vertical subdivisions. To fix this reduce the Max Points to 4 and simply adjust any of the curves and the number of curve points will be reduced. Also, if you reduce your brush size while you are not over a curve (when the cursor is red), when you click on a curve the thickness of the surface is changed to match the brush size.

At this point I felt that the arms and head proportions were not matching the concept (**Fig.12**). To remedy this select the upper body, turn on Symmetry and mask everything except the arms. In Scale mode place one end of the transpose tool at the shoulder joint and the other along the length of the arm, and scale the arms to make them bigger. Next adjust the head size, masking it and scaling it to a smaller size.

Once again using the Curve Surface brush, create the forearm protectors by drawing strokes perpendicular to the arm length with Snap on. Adjust the curves with Snap turned off and use GroupsSplit. Use the Move brush to pull the edges around the arm.

To create the straps that hold the forearm armor, select the Curve Tube Snap brush (**Fig.13**). Change the Brush Modifier value to 4 (this defines the number of vertexes on the cylinder section). Draw a curve at the forearm. Adjust the curve with the Move brush so that the strap comes from under the armor. Change to Move mode and drag, starting at the strap, to create a transpose tool. Press Ctrl while dragging the inner center circle of the transpose tool to duplicate the strap. Reposition and scale the new strap to fit the wrist. Use the Move brush to finalize the adjustment.


13

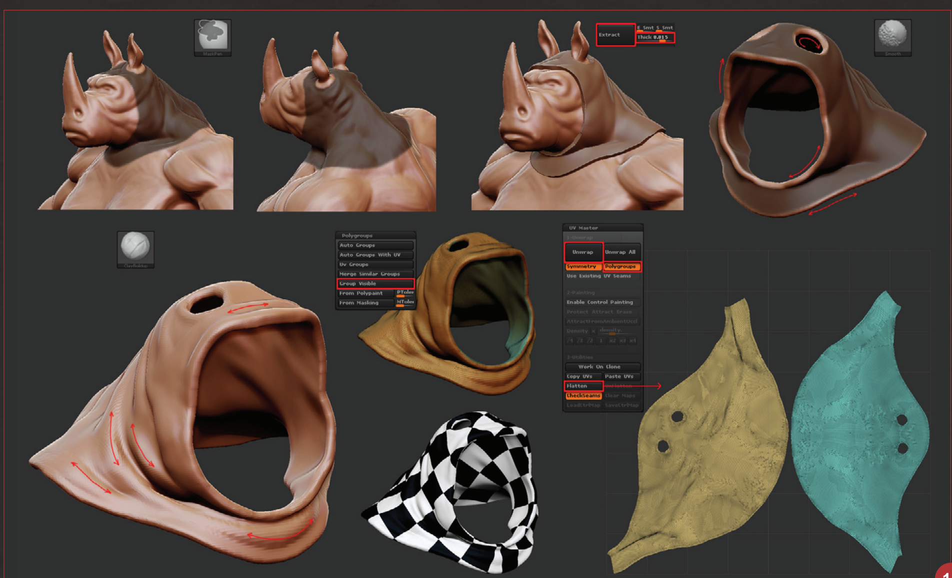
The head protection will be created with a different process (**Fig.14**). Select the upper body subtool and using the Standard brush, press Ctrl while painting on the model to create a mask. Mask the protection area, leaving the face and the ears uncovered. In the Subtool menu go to the Tool menu, set the Thick value to 0.015 and press Extract. A new subtool will be created for the hood and if you select it you will notice that everything is masked except the borders. Use the Smooth brush at the borders to make them round. Clear the mask (Ctrl and drag) and using the Clay Buildup brush with the Backface Mask option enabled, create some folds around the hood. Smooth them with the Smooth brush.

When you extract a mesh from a mask, ZBrush automatically creates different polygroups for the inner faces and edge faces. Press Ctrl and click the interior surface of the hood to isolate this polygroup. Press Ctrl, Shift and drag on the background to invert the visibility. In the Tool menu, under Polygroups, click Group Visible. The exterior and edges of the hood are now part of the same polygroup. Press Ctrl, Shift and click the background to unhide the interior.

In the Plugins menu open the UVMaster. Enable Polygroups and press Unwrap to generate UVs for the hood. By pressing Flatten you can check the layout of the UVs. Press Unflatten to leave. If you wish to see a texture applied to check the distortion, pick a checker pattern in the image slot under Texture Map, but don't forget to clear it afterwards.

The creation of the base for the shoulder armor repeats the Curve Surface technique (**Fig.15**). Select the upper body subtool and hide the rest. Disable the symmetry because there is a single shoulder pad. Select the Curve Surface brush with Snap enabled. Draw the first curve at the shoulder near the neck, bearing in mind that this curve will be lifted to make the vertical protection (as you can see in the concept sketch). The second curve will be the line that creates the edge between the vertical and horizontal areas. Keep drawing smaller curves in the direction of the arm to make a point at the end of the shoulder pad.

Disable Snap, make sure Bend is on and lift the vertical protection curve. Manipulate the curves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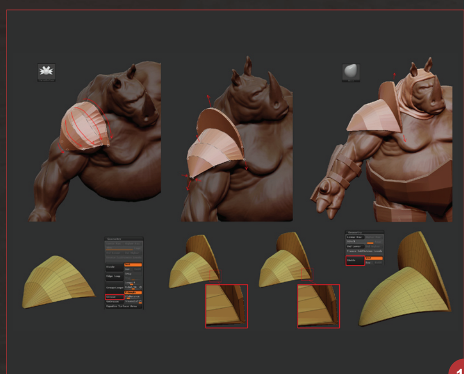
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to match the concept shape. Press GroupsSplit. With the Move brush, adjust the overall form.

## Armor – Detail

Select the horizontal part of the shoulder protection, hiding the vertical portion. In the Geometry submenu (in the Tool menu) press Crease. You will notice that the harder edges now have an inner dotted line, which means that these edges will not smooth while subdividing the geometry. Press Crease again to define the hard edges on the vertical part. Press Divide four times.

The hard edges hold the form while subdividing, which creates the effect we want; however, next time we subdivide it we don't want it to do this, so press Shift and the Uncrease button to clean all the crease marks. Divide it once more. You will notice that the edges between the two planes are now smoother (**Fig.16**).

Mask the central area of the shoulder pad, excluding the tips. Invert the mask and blur it (press BlurMask in the Masking submenu). Select the Curve Pinch brush and draw a curve along the center of the shoulder pad. A crease is created at the center of the shoulder pad, while the mask prevents the tips from deforming. Clear the mask. With the Move brush, adjust the deformations near the tip. Use the Polish brush to even the surface.

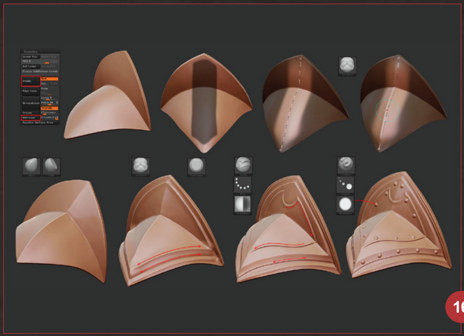
Using the Curve Pinch brush, create some decorative lines along the border of the pad. Press Alt while creating the curve to create a pinch inwards. To flatten the hard edges use the Trim Dynamic brush.

Load the Slash2 brush from the Brush > Slash directory in the Lightbox. In the Alpha menu increase Blur to 15 and enable LazyMouse. With this brush, draw some decorative lines to simulate extra metal layers on the shoulder pad. To add a few decorative nails choose the Standard brush, set it to DragDot mode and pick Alpha 06. Adjust the Draw Size to set the size and place them along the edge of the panels.

The techniques used to create the shoulder pad can also be used to create the other armor parts, which is detailed in the 3DTotal Publishing book *ZBrush Character Sculpting: Volume 1* (**Fig.17**).

## Pose

I prefer to pose the character before detailing it any further because the posing will lead

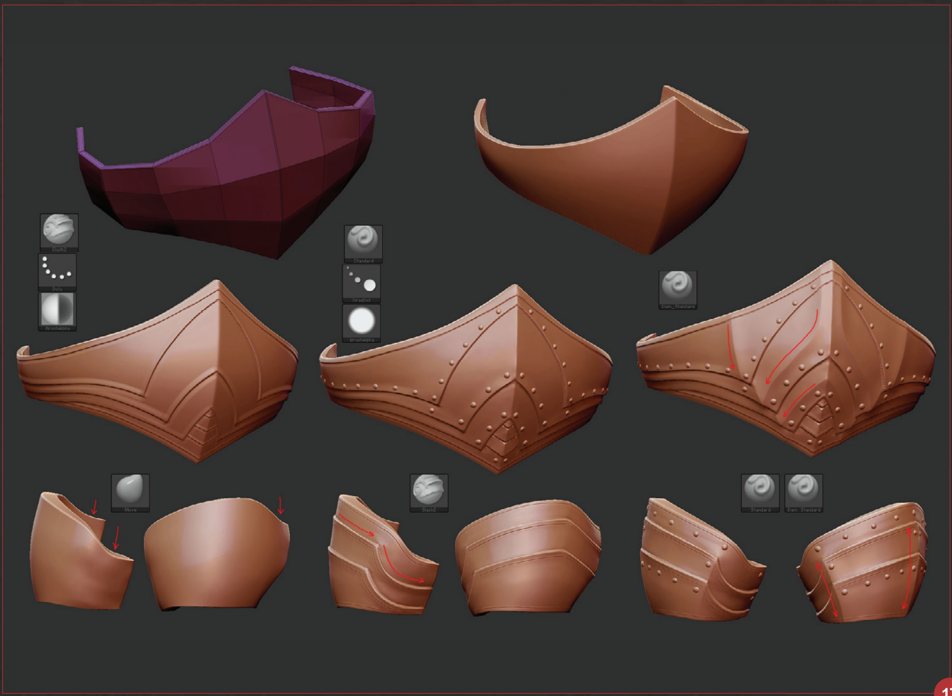


16

to distortions that will have to be fixed and also because it will help to break the model's symmetry. Do not forget to save before you start the posing process.

We will use Transpose Master to pose the character. However the thin elements that make up the armor might suffer some distortions when re-importing the pose back to our model. To reduce the chances of that happening I would advise that you select each armor subtool, go to subdivision level 3 and press DelLower to discard lower subdivisions.

In the Plugins menu (**Fig.18**) select Transpose Master and choose TposeMesh. ZBrush creates a new tool in which all elements are represented at their lowest subdivision level and as part of the same subtool so that they can be manipulated together.



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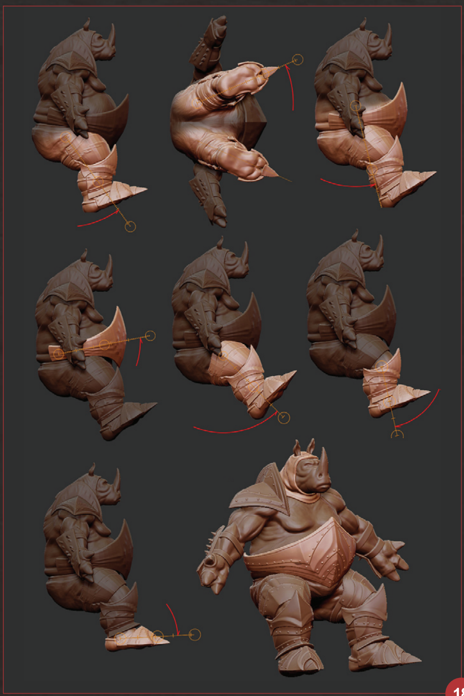


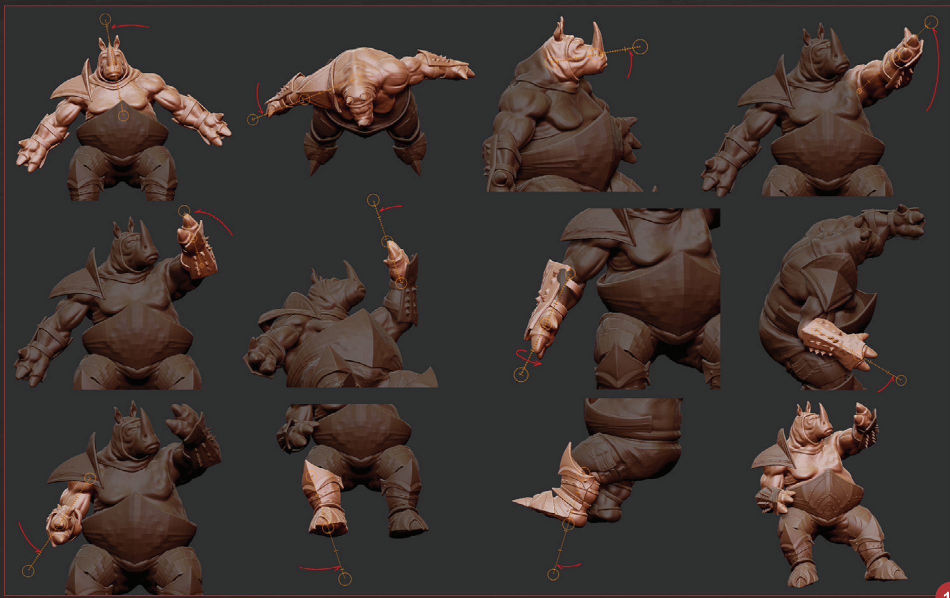
18

The process of posing consists of masking parts of the model that stay in place while using the Transpose tool to Move, Rotate and Scale the unmasked area. When dealing with armor bear in mind that the metal pieces should not be distorted, unlike the flesh and cloth where it is desirable. So the armor elements should always be completely masked or unmasked, not including any gradients.

Let's pose the character in a seated position. Turn on Symmetry X. Unmask the whole leg and all its armor pieces, and rotate it forward in a side view. Change to a bottom view and rotate the legs outwards using the same mask. Then unmask everything from half of the belly down and rotate the lower body to the front so that the character's back can lie against the chair. Unmask only the belly protector and rotate it upwards to avoid intersecting the thighs. Unmask the legs again and rotate the thighs further forward. Unmask the lower leg, including the knee protection, and rotate it to make a 90 degree angle with the thigh. Unmask the feet and their armor, and rotate them forward in order for them to lie flat on the floor.

The rest of the pose will not be symmetrical, so send the changes to the main model to check if everything went as planned. In the Transpose Master menu choose Tpose > SubT. The model should be posed and some intersections might happen between the fleshy elements and armor, which can be easily fixed with the Move brush. If you have projection problems with any of the armor elements, just open the tool you saved, select the part that needs to be replaced and append it to the posed model. Then move and rotate the piece to put it in place and delete the deformed one. As the armor pieces are not deformed this is easy to do.

Initiate the Transpose Master again (**Fig.19**). Now we will take care of the asymmetrical parts of the pose. Unmask everything from half the belly up and tilt the upper body to his right. From a top view, rotate the body to face towards his left arm. Unmask the head and rotate it further left and a bit up. Unmask the left arm and raise it (expect the worst deformations to happen while placing the arm in this position). Unmask the left forearm and bend it inwards from the elbow. Unmask the hand and bend it further inward to create the joint at the wrist. Unmask the right forearm (starting at half of the forearm and blurring the mask) and twist it together with the forearm protectors. Unmask the entire right forearm and bend it from the elbow to make it at 90 degrees with the arm. Unmask the right arm and rotate it to bring it closer to the body. Unmask the right lower leg in front view and rotate it inside to a relaxed position. Unmask the left lower leg and rotate it to the front. Rotate the foot to make it more parallel to the ground. In the Transpose Master menu choose Tpose > SubT to transfer the pose to your model.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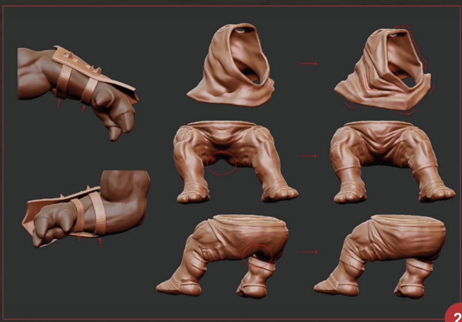
20

The next step is to correct the deformations that resulted from the posing process (**Fig.20**). Use the Move brush to reposition volumes and the Clay Buildup brush to reshape the muscles and cloth. The deformations in your model might be very different from the ones in mine.

The left hand will be holding a chalice, so let's position the fingers accordingly. Unmask the lower finger and rotate it towards the palm.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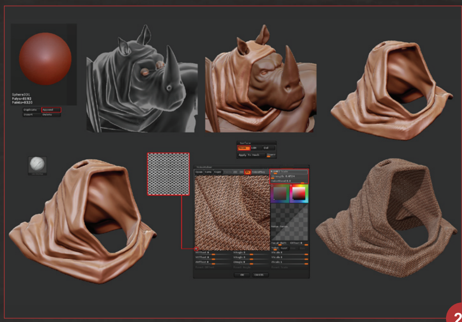
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23

Unmask half of the finger and rotate it some more towards the palm. Unmask the thumb and rotate it out so it can help grip the object.

## Details

Now the character is posed it is a good time to add the straps that hold the shoulder and belly protectors (**Fig.21**).

To create the eyes choose Append from Tool > Subtool and pick Sphere3D (**Fig.22**). Select the sphere subtool and scale it down. Move it to the eye location. To duplicate the eye, press Ctrl and drag the center of the transpose tool in Move mode. Place it at the other eye location. Select the hood subtool and subdivide it twice. Using the Clay Buildup brush, detail the folds and don't be afraid to exaggerate them as the chain mail texture we are about to apply will reduce their impact.

In the Tool menu, under Surface, click on Noise. The Noise Maker interface will open. There is a small sphere icon on the lower left corner of the model view. Click on it and load the alpha image of the tileable chain mail (downloadable from Pixologic's website in the Alpha library under Patterns). Enable UV so that the pattern is applied according to the UVs we have set before. Reduce the Scale to 0.048. Set Strength to -0.47 and ColorBlend to 0.8. Set the color of the right color palette to black and press OK.

One important detail is the way that the straps interact with the body flesh (**Fig.23**). With the Clay Buildup brush, carve the area in which the strap and body make contact. Then sculpt the borders of the flesh to make them bulge from the tightness of the strap. Now you can start to work on the wrinkles on the head (**Fig.24**).

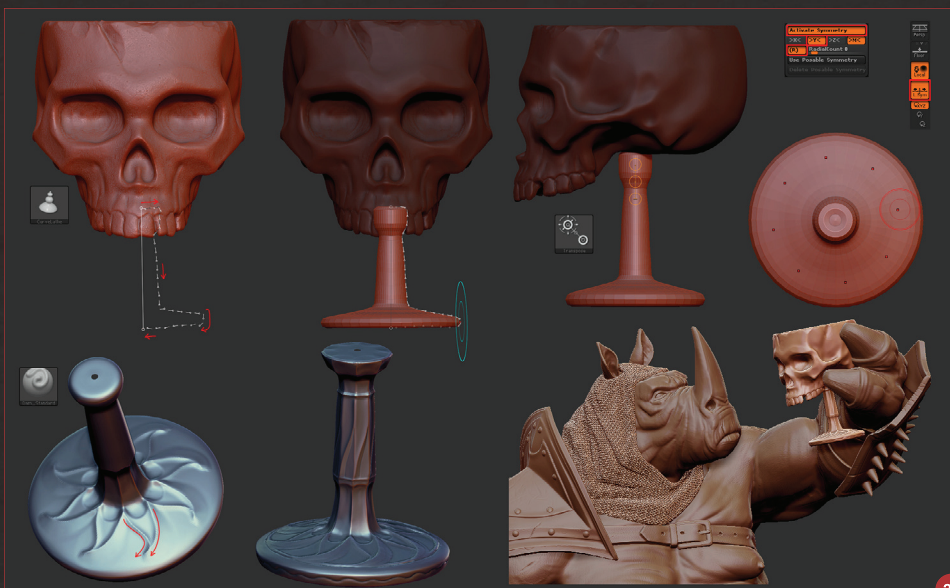
## Props

I then created the props such as the skull, cups, axe and chair using many of the tools that I mentioned earlier (**Fig.25 – 27**). A detailed breakdown of how the props were created can be found in the 3DTotal Publishing book *ZBrush Character Sculpting: Volume 1*.

## Painting

The model was polypainted using only the Standard brush and a series of alphas. To do


24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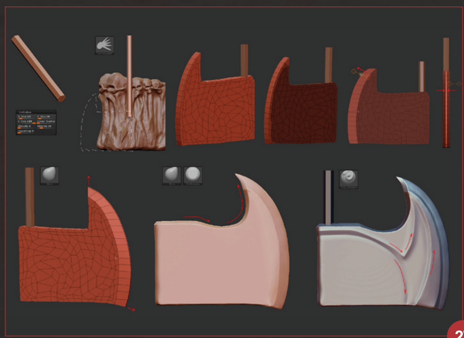
this you simply need to enable RGB and disable Zadd so the brush paints rather than sculpts. In my opinion the best base materials for painting are SkinShade4 and MatCap White01, so alternate between the two while painting as the specularity of Skin_Shade4 might interfere a bit with your perception while painting.


26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Select the upper body subtool. Start by choosing a beige color in the color picker and choose Fill Object from the Color menu. Change to Spray mode, with a dark brown color, and pick Alpha 08. Paint randomly over the surface with low intensity to create some color variation. With a higher intensity, paint the darkest spots around the eyes, nails, nostrils, lips and nipples. Also darken the color slightly around the muscle forms. Use DragRect mode and a dark brown, and choose some armor damage alphas (download them from the Pixologic website, under Alphas > Effects). Drag them over the skin to add stains.

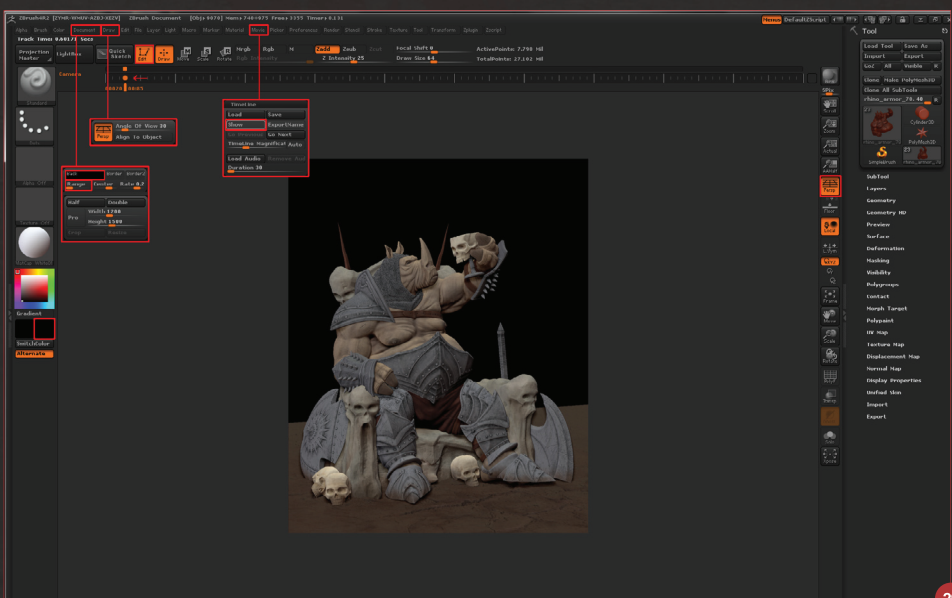
To enhance the sculpted wrinkles, in Tool > Masking choose Mask by Cavity and invert the mask. Press Ctrl + H to make the mask invisible while you paint. Use a dark color with low intensity and a large brush to paint over the model to reveal the detail. Use the Standard brush with Alpha 58 to paint the fibers along the horn and nails (**Fig.28**).


28

This same technique was used for all the different parts of the model.

## Composition

Create a new project and in the Document menu, set the document size to 1200 x 1500 (**Fig.29**). Choose pure black on the color swatch and choose the Back swatch in the Document menu to make the background black. Also set the Range slider to 0 to eliminate the gradient.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Load the rhino tool into the document, press Edit and turn on Perspective. In the Draw menu set the Angle of View to 30. Set the view of the model to what you think is best. In the Movie menu enable Show under Timeline for the camera timeline to show at the top of the screen. Click anywhere on the timeline to create a key frame that will store the current view. This way you can go back to this exact view every time you click on the key frame in case you need to change the view for editing.

Remember that from this moment on you should save your project (File > Save) and not just your tool, otherwise you will lose all your work.

## Lights and Materials

The lights and materials should be developed at the same time and tested as often as possible

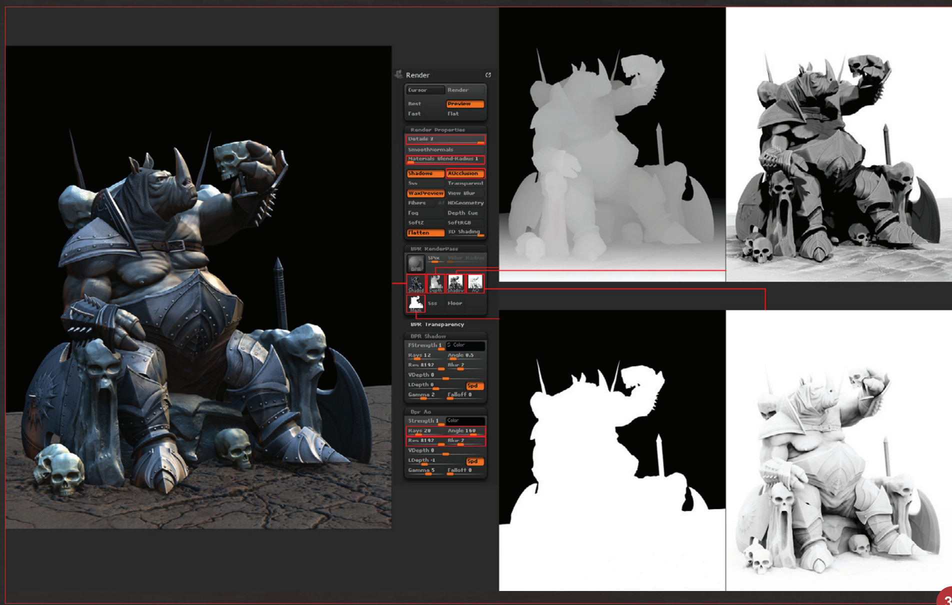
to make sure they work well together. For a detailed breakdown of the lighting and materials setup, take a look at the 3DTotal Publishing book *ZBrush Character Sculpting: Volume 1*.

## Render

When the model and material were ready it was time to make the final render (**Fig.30**). In the Render menu, in Render Properties, enable AOcclusion. Under Bpr Ao increase the number of Rays to 20, set Angle to 160, Res to the max and Blur to 2 in order for the ambient occlusion to have higher quality.

In Render Properties, raise the Details value to 3 and set the Materials Blend-Radius to 1 so that ZBrush slightly blurs the frontier between different materials.

Press BPR to render the image. After the image is rendered, the different render passes show under BPR RenderPass. You can click on each of the image icons to save the Shaded render, the ZDepth buffer, the isolated shadows, Ambient Occlusion pass and the mask (alpha).



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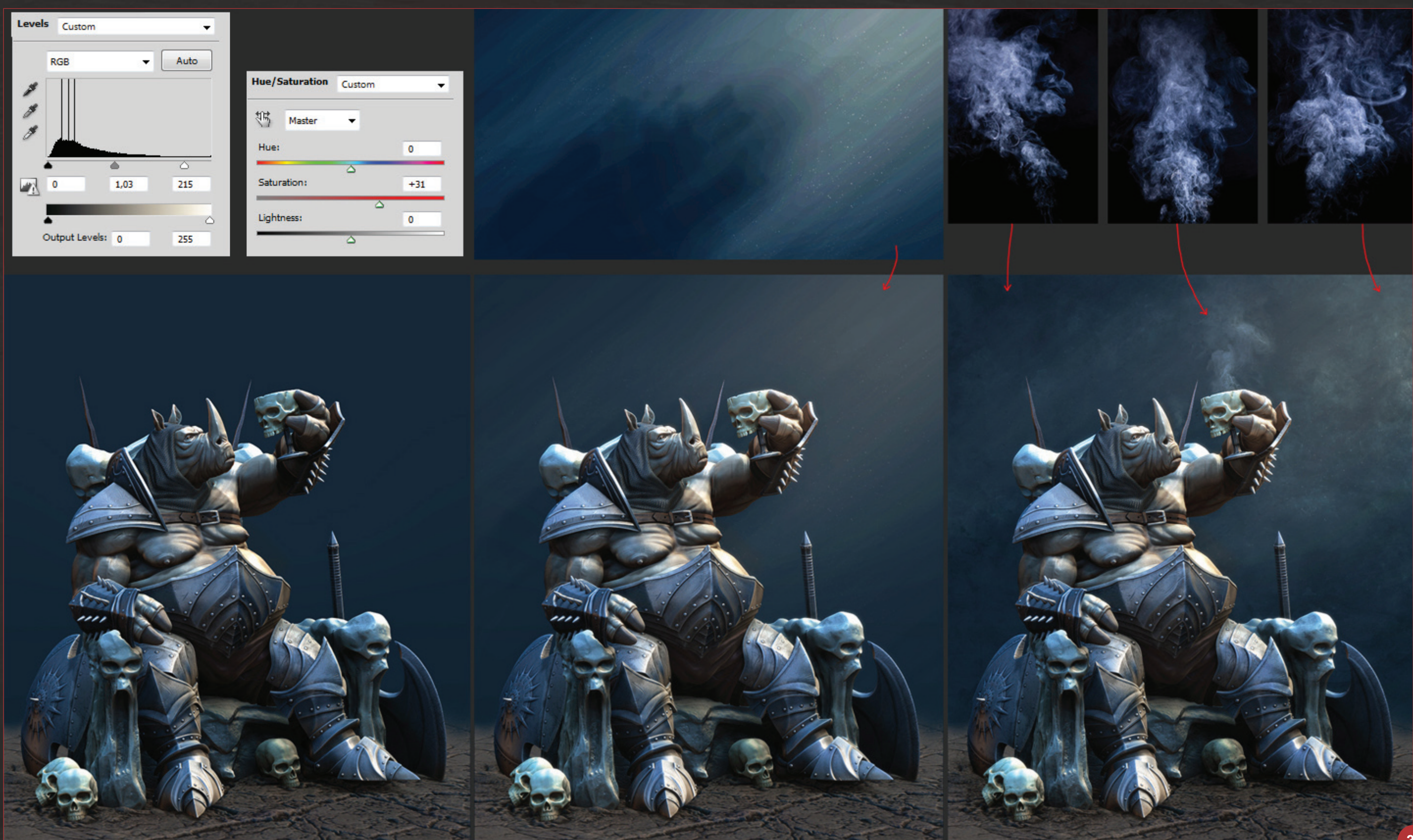
## Final Touches

After saving the image you can do a few final touches in Photoshop (**Fig.31**). Adjust the Levels to make the image brighter and increase Saturation to make the colors more vivid. Blend the horizon with the background color. Paint some subtle light beams coming from the top-right corner with a soft brush and blending mode set to Screen. Some dust particles can also be painted on another layer to enhance the mood. To finalize the image, use some smoke photos from a texture site and set them to Screen blending mode to create the smoky fog and the steam coming out of the chalice.

**Fig.32** shows the final image. I hope you found the tutorial interesting and enjoy using some of the features of ZBrush 4R2.



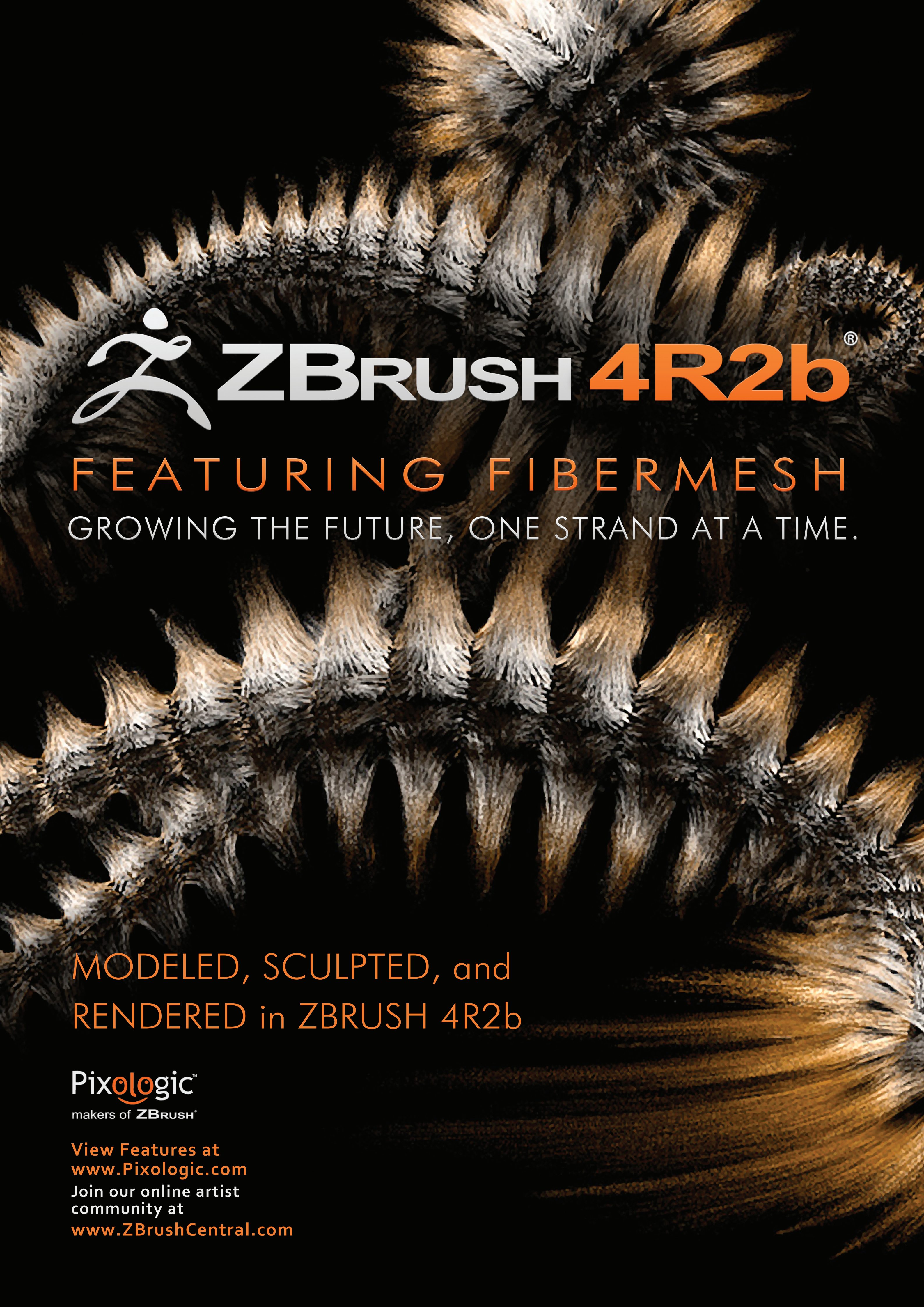

31

If you enjoyed reading this tutorial and would like to read a more detailed account of how this image was created along with many more excellent ZBrush tutorials, turn the page to find a discount code for 3DTotal's excellent new book *ZBrush Character Sculpting: Volume 1*.


Jose Alves da Silva

Web: http://www.artofjose.com/

Email: joalvessilva@netcabo.pt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# CHARACTER PRODUCTION

Over the last couple of years, modeling realistic 3D heads and busts has become really popular. In this series we will be shown how to do this using 3ds Max, Maya and ZBrush. From the basic head model and a highly detailed head sculpt, through to texturing and post-production, our artists will cover every aspect of the creation process, providing us with the perfect opportunity to learn from their experience.

# Chapter 02 – Modeling the Features

Software used: 3ds Max

In the previous chapter we saw how I created the base model that I'm using for this project. The eyes, nose, mouth – all the features were modeled in 3ds Max and I created topology that would support my ZBrush sculpting.

In this chapter I will show how I added all the extra details to the face, like the wrinkles, skin pores, etc.

I mostly used simple brushes like the Standard, Clay Buildup, Inflat, Move and Dam Standard, and I worked on a Wacom Intuos3.

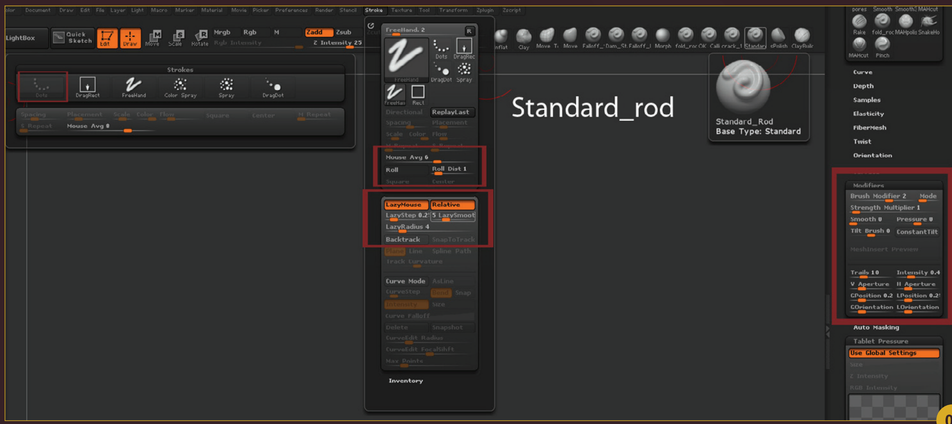
I tweaked the Standard brush and renamed it the "Standard_Rod" brush to make it more comfortable for me to use (**Fig.01**). One of the things I like about ZBrush is that I am able to customize the interface; I like what I use the most to be quickly accessible. I have to admit that I don't use shortcuts that much; I have the Move brush on the M key, but that's about it.

To customize your interface go to Preferences > Config and click on Enable Customize. To have small icons go to Preferences > Interface and remove Wide Buttons (**Fig.02**).

With Enable Customize on you can Ctrl + Alt + click and drag almost anything you want, and add or remove them from your interface. If you want to remove some elements from your interface use Ctrl + Alt + click and drag it to the work space (where you sculpt)(**Fig.03**).

If you want to remove the gradient color from your work space go to Document, and change the Range to 0 (**Fig.04**).

Now to save it and have it to hand the next time you open ZBrush, go to Preferences > Config and click on Store Config (**Fig.05**).

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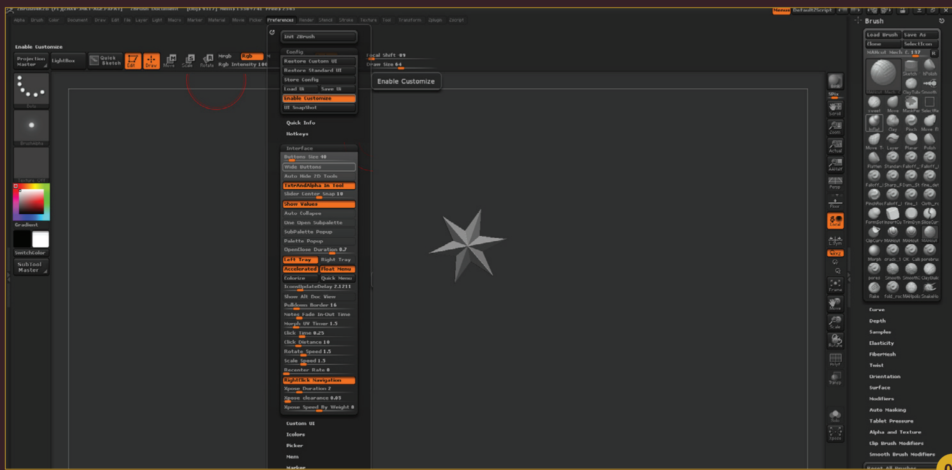


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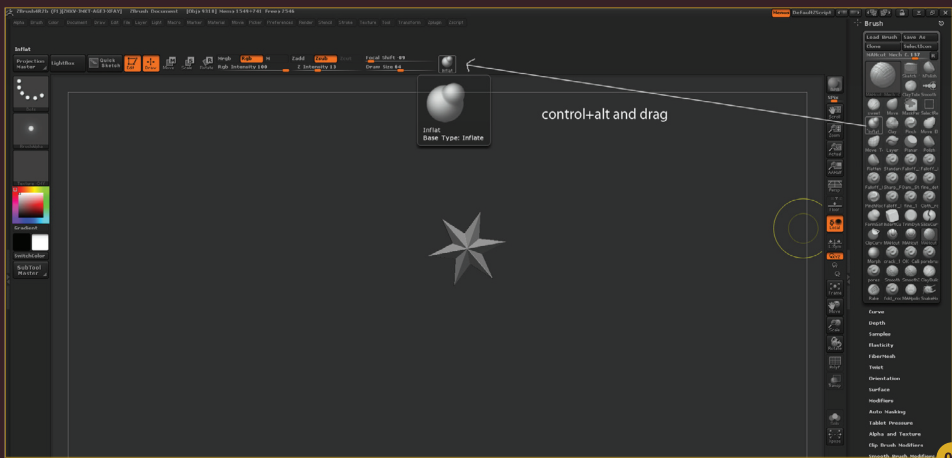


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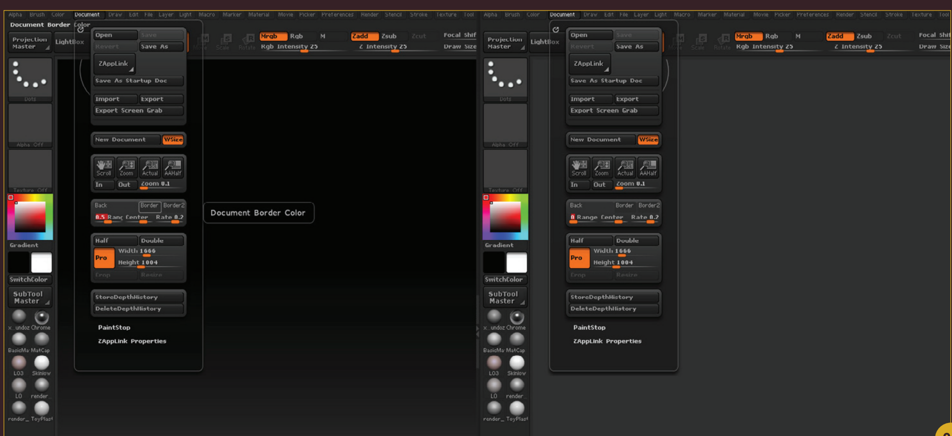


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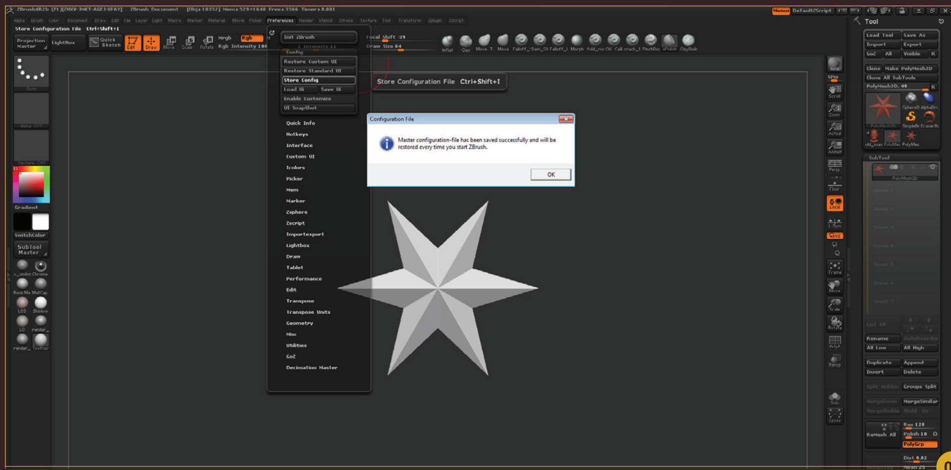
I now go to Tools, click on Import and I import the OBJ that I previously exported from 3ds Max. The first thing I do is add one division, no more! It's really important not to get to the details too fast. What I want to do is to try to get the overall features of the face and not lose myself in details.

With only one division I'm trying to go as far as I can. At this stage I'm using the Move, Move Topological, Standard_Rod, Clay Buildup and a little bit of the Dam_Standard brush. I've already detailed the eyes, nose, mouth and the ear quite a bit in my base mesh in 3ds Max, so now I mostly focus on how they work together, the space between them and their size, etc (**Fig.06**).

Once I'm happy with the overall flow of the face I add one more division and focus more on the muscles and skin flow, still using the same brushes as before but with more focus on the Clay Buildup and Standard_Rod brushes (**Fig.07**).

Since I know my final shot is going to focus on the face I don't really detail the top or the back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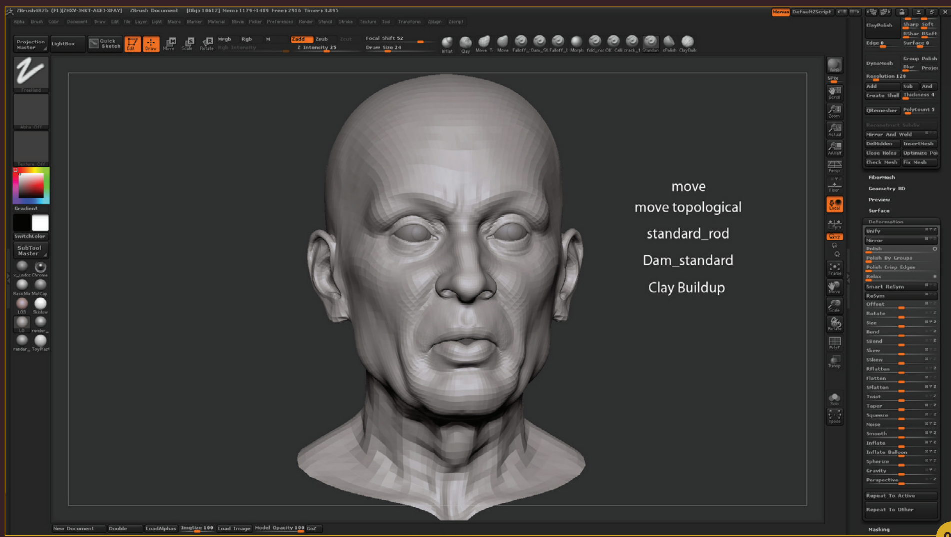

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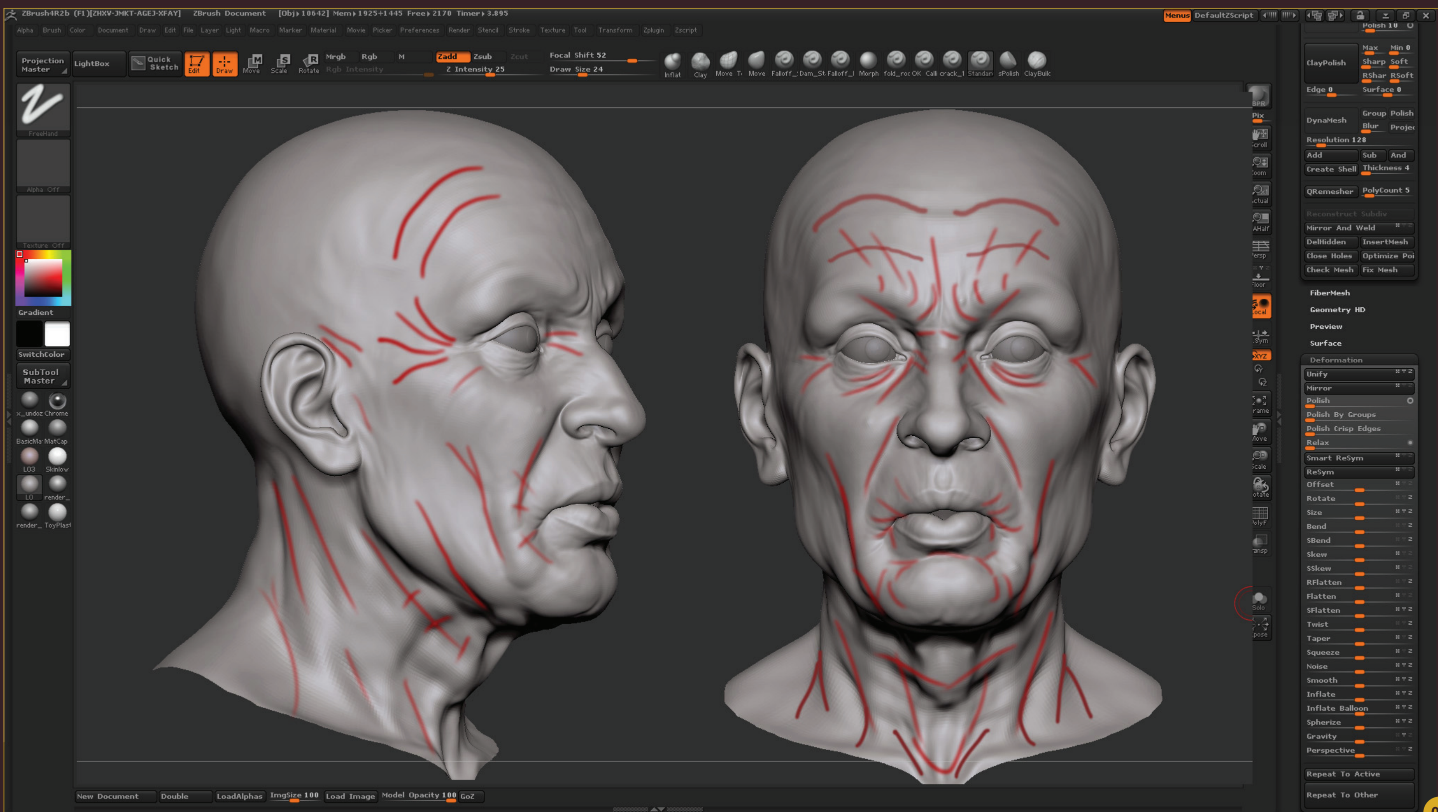
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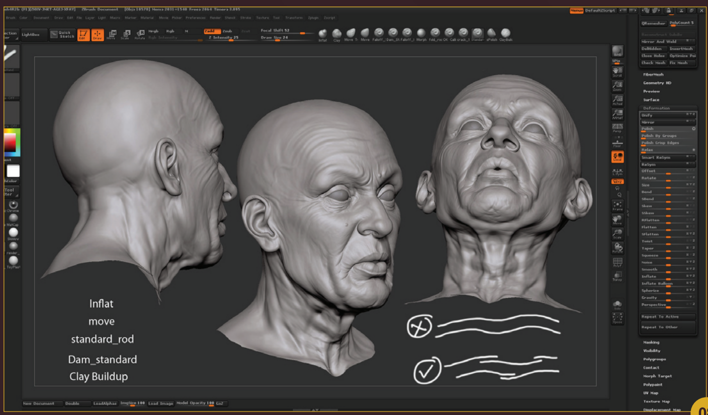
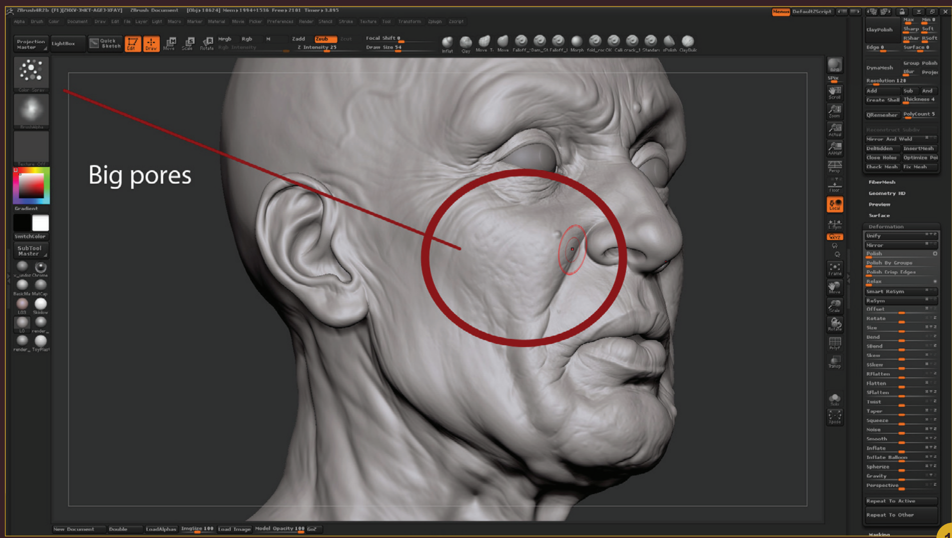


08


09

of the head, but it's really important to look at the model from all sides. At this stage I add one more division and I refine what I did previously, still using the same brushes. One of my main focuses is to be sure I don't have a lot of long, uninterrupted lines. I try to break them up; for example, the wrinkles on the forehead go from one side to the other on the face so I break them up once or twice to give them a more interesting look (**Fig.08**).



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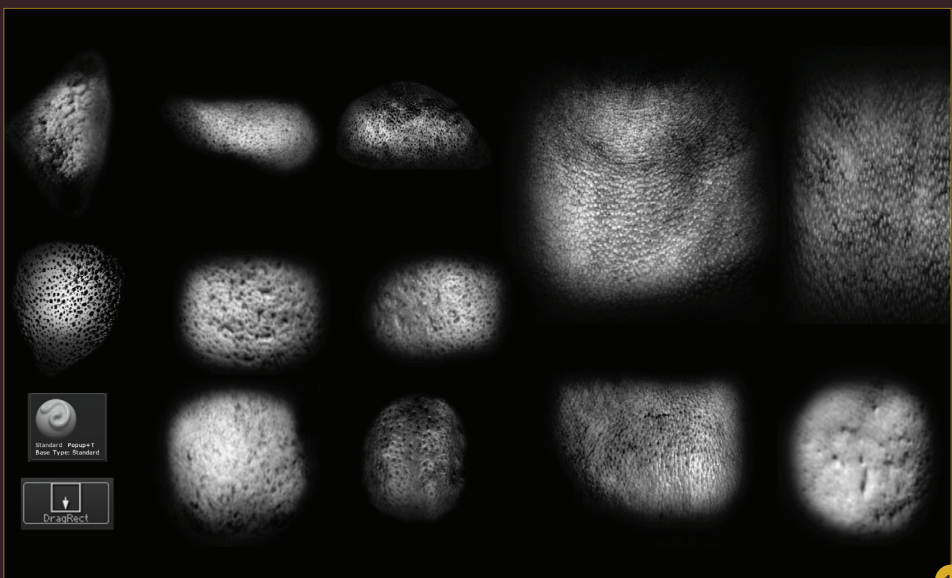
Up to this point I've only used the same brushes and taken my time to place all the elements I want to see on this face. One thing I like to do before going into small details is to bring more irregularities to my surface. I don't want to have skin that appears to clean and stretched, so I start adding some bumps to my sculpture. I sometimes use the Surface Noise in ZBrush, but for this face I want to have more control. I change my Strokes to Color Spray, select Alpha 21 and blur it to remove the pixelated effect. The reason why I've chosen this alpha is because I don't want the detail to look too round and artificial (**Fig.09**).

Then I start adding a bit of variation to the skin. I make this look more exaggerated than I want it to be at the end and apply it on a layer to give me more control over the effect. I then reduce the intensity of the layer to produce a small surface variation (**Fig.10**).



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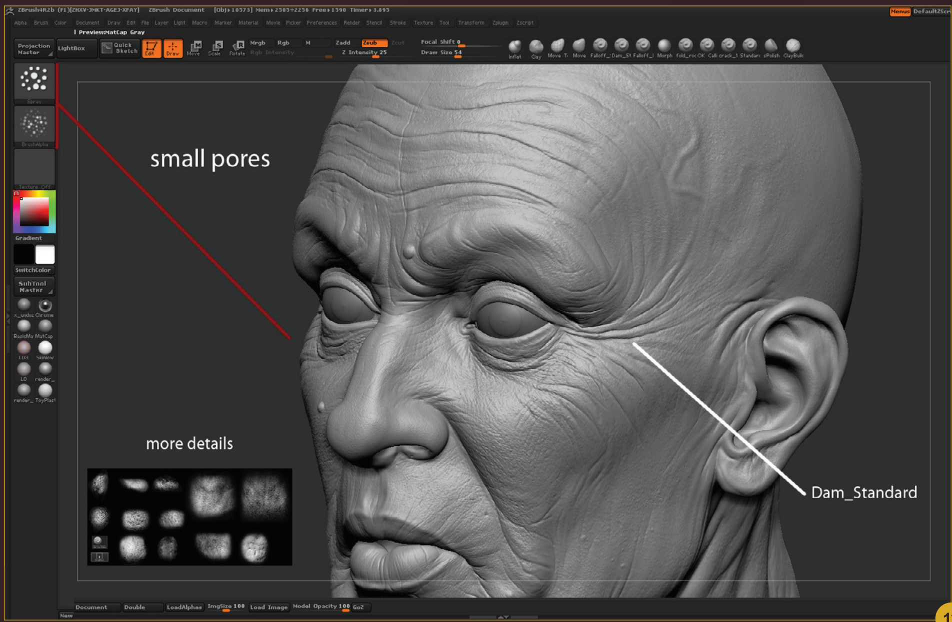
In **Fig.11** you can see some alphas that I made from photographs a few years ago, which I can use to add detail to skin. I tend to use them less and less now, but they still give some nice results here and there. I use them with the Standard brush selected and with DragRect set to a low intensity, again applied on a layer so I can reduce or boost the effect the way I want to. For this particular head I barely use them and instead use the Standard brush with Spray selected and an alpha that has some random dots (I can't remember where I got it, but its pretty simple to recreate in Photoshop).

All the other details and the lines are done one by one by hand with the Dam Standard and Standard_Rod brushes. I'm not planning on

using real skin photography for the textures, and since I want to hand-paint my diffuse map I need to sculpt all the detail I want to see (**Fig.12**).

Most of the work is done now. I then add the earrings so I can sculpt the earlobes around them, and again look at my model from all angles to be sure everything looks OK (**Fig.13 – 15**).

So far I'm not relying on any texture to make the details of the skin. It's something I used to do a lot (texturing the face and then converting the



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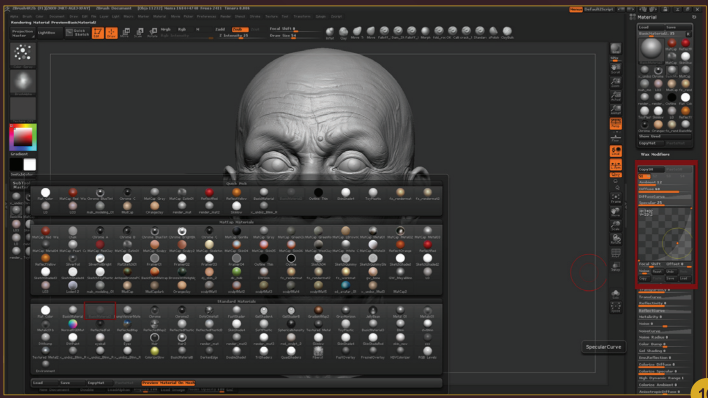

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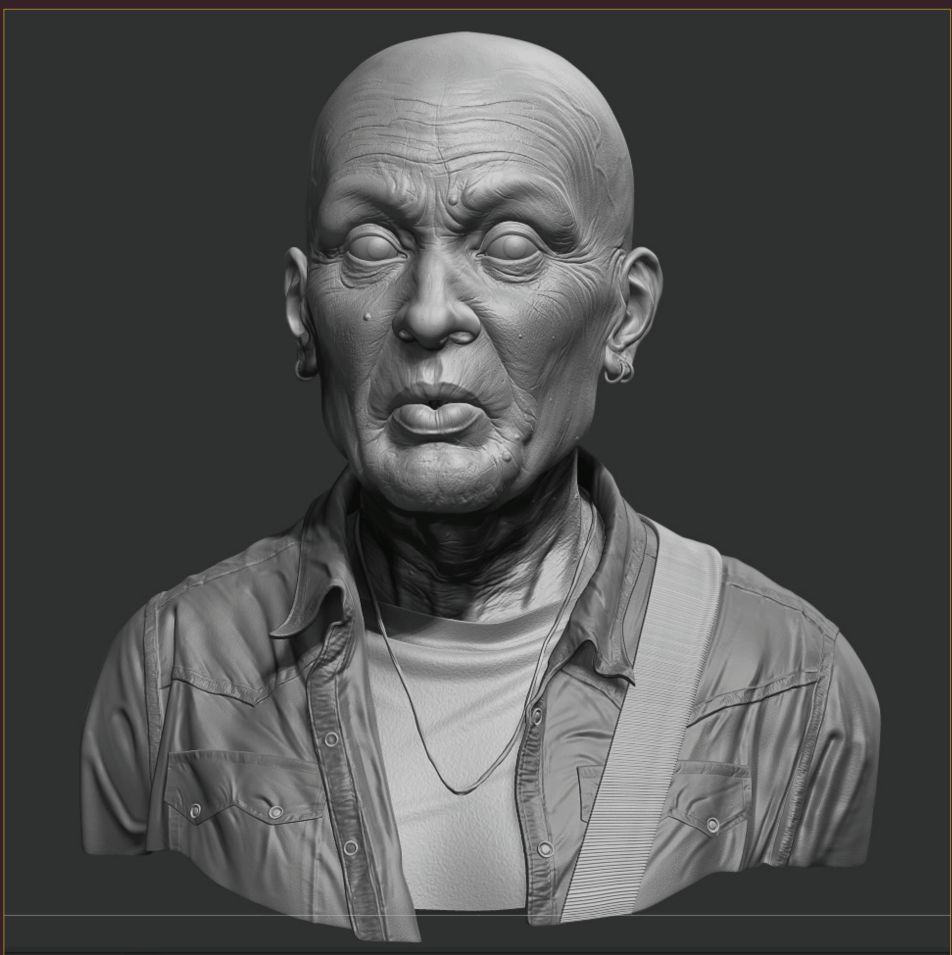


texture into a mask and sculpting from there) but I started to find it limited me. It's perfect when creating a specific person, but now I prefer to look at photography for reference and hand-sculpt all the details. It gives me more control over the look of the face and also more control when I texture it.

My model's almost done, but I want to test it with lots of lights to see how all the details react. When rendering in 3ds Max with mental ray or V-Ray, the SSS and the GI tends to reduce all the details on the skin and often makes the skin look too soft and too smooth. To test this I'm using the BasicMaterial2 with tweaked specular values (**Fig.16**).

I'm using a basic material and not any other fancy MatCaps that are available, because I don't want to have extra cavities that will accentuate my details and make me think they are deep enough when in fact they only look deep because of the dark color of the extra cavities of the fancy MatCap. I first test the face with one light and BPR (**Fig.17**).

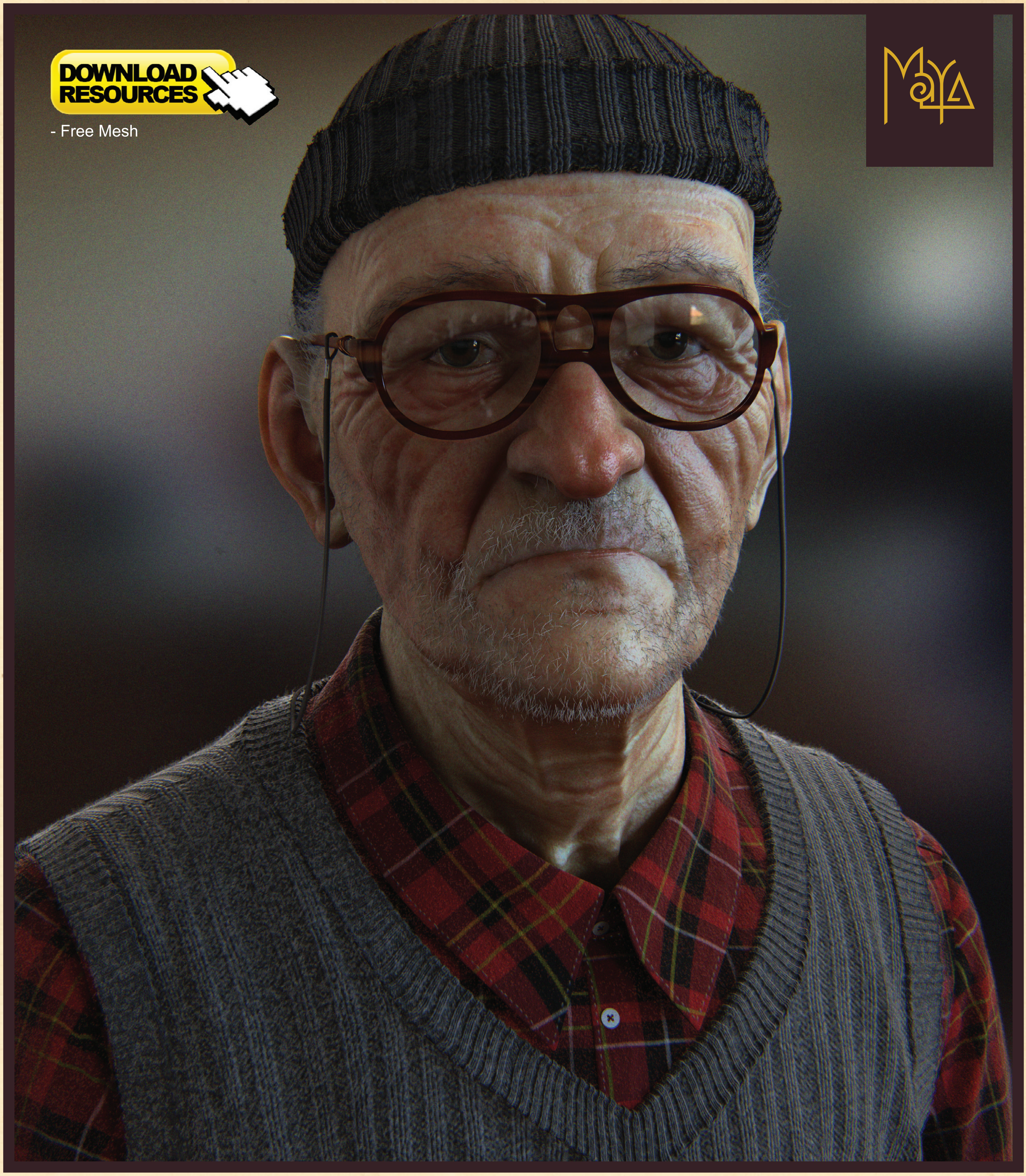
Then I add two more lights to see if I can still see most of the skin details I put on my model (**Fig.18**). That's about it for the face sculpture. The next step will be the UV Unwrap to prepare the texturing of the face.

## Rodrigue Pralier

Web: http://www.rodriguepralier.com/

Email: rodriguepralier@hotmail.com

# CHARACTER PRODUCTION




Over the last couple of years, modeling realistic 3D heads and busts has become really popular. In this series we will be shown how to do this using 3ds Max, Maya and ZBrush. From the basic head model and a highly detailed head sculpt, through to texturing and post-production, our artists will cover every aspect of the creation process, providing us with the perfect opportunity to learn from their experience.

# Chapter 02 – Modeling the Features

Software used: Maya

Hello! In the last chapter we used some very simple techniques to block out the main form of our character and establish a well organized edge loop structure. The method I demonstrated in the previous chapter will enable us to continue adding more geometry, which will add some details to specific facial features.

Perhaps the most important part of a face are the eyes and the area around them. We are so used to seeing people's eyes that making believable CG eyes is not an easy task. So let's continue with that area.

The eyeball itself will consist of two parts: the inner one with a slightly concave iris area and a slightly bigger outer one with a bulge over the iris beneath it.

As a starting point you can use the sphere that we created at the beginning of the first chapter or create a new one from the front view. Make it slightly bigger than the eye socket opening and try to center it using a front image plane.

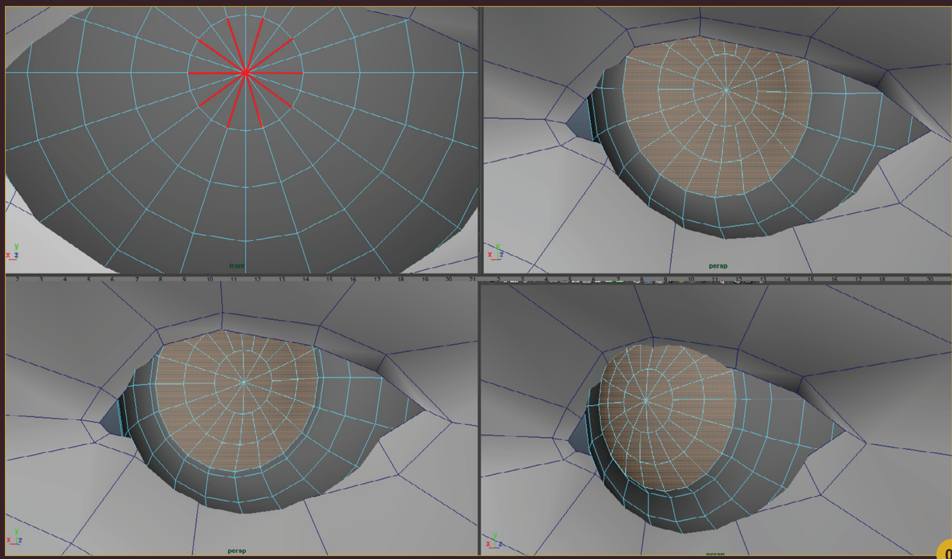
A default poly sphere comes with 20 triangles at the pole, which makes an unwanted pinch on the geometry. To get rid of these problems, select every other edge radiating from the pole and delete them.

Now instead of 20 triangles you have 10 quads that will render much more smoothly.

Select those ten faces and grow the selection twice, use the Scale Transform tool to scale down selections on the Z axis to make it slightly concave. Move it back into place on the Z axis. Add one more edge loop at the edge of the iris to straighten the edge.

To make the outer eye geometry, duplicate the one you just created and scale it up just enough to cover the inner part. Select all concave polygons and this time scale them up on the Z axis to make a bulge. Also use Move Transform to get the bulge back into place.

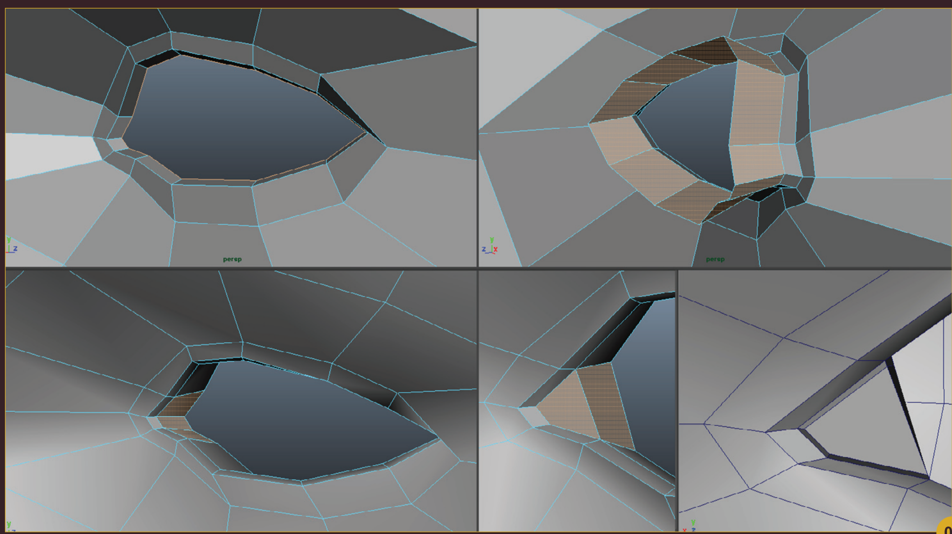
Select the inner area and add the outer geometry to the selection, then press P on the keyboard to make a parent connection. The last few steps are illustrated in **Fig.01**.


01

Let's continue by shaping the eyelids and area around the eye. When we have the eyeball in place we need to reposition the geometry of the eye opening to conform to a spherical eye. Don't expect to make it a perfect fit at this point since there is more geometry to be added. Also, if necessary, rescale the eyeball. It is a good habit to arrange objects in separate display layers so you can easily hide and unhide any object at any given time. Hide the eyeball to make some room for the next few steps.

Select the border loop of the eye opening and extrude the selection inwards to make the eyelid thickness. Scale down the last selection slightly to make an easier angle transition between the eyelid shelf and the rest of the geometry. Next extrude the opening edges once more and scale outwards to make geometry that will penetrate the eyeball and prevent us from having any gaps between the head and the eyeball.

Select and delete three faces at the inner corner of the eyelid to make a place for the tear duct. Bridge the open edges left over from the deletion and, using the Cut tool, cut in a shape as demonstrated in **Fig.02**.


02

Now it's a good time to add some more geometry to both rings and the loop surrounding the eye.

Let's start with cutting the rows radiating from the eye. To add a complete edge loop all the way, use the Insert Edge Loop tool. Newly created edges are marked in **Fig.03**.

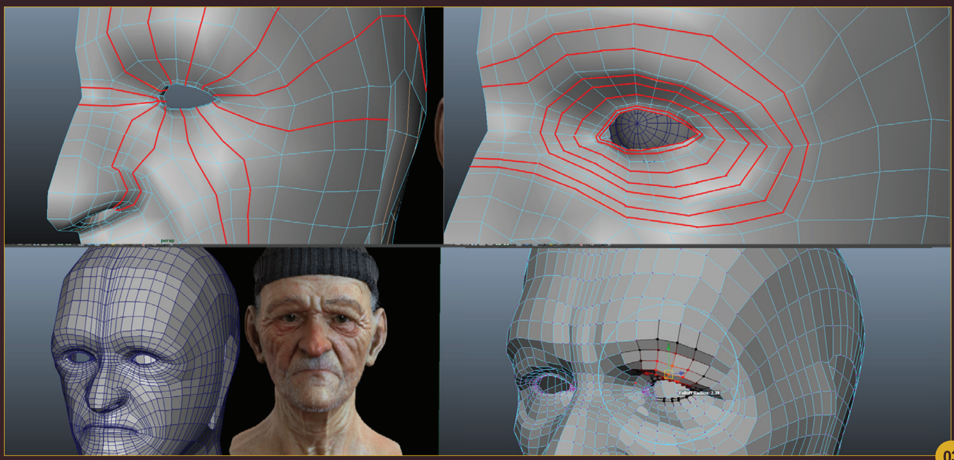
New edges are added linearly and need to be repositioned to smooth out the surface. To evade tedious vertex pulling and pushing, the best strategy would be to use the Sculpt Geometry tool.

Use the Pull brush with Auto Smooth checked and the Smooth Strength set to 3. Set the intensity down and swipe gently over a new geometry.

Now we should add a few loops circling the eye. Added loops are also illustrated in **Fig.03**. Repeat the same geometry sculpting process to smooth this area. Add more loops using the same technique to even out the overall geometry density.

Now things are getting more complicated and at this point you should have more than enough geometry to shape out all the major features of the face.

At this point I am using the Move tool with Soft Selection and the Sculpt Geometry tool to shape out most of the facial features and fix the proportions. Patience is your best route when it comes to this task and it can often take a fair amount of time to reach proportions that you're satisfied with. Don't forget that you can always come back to the proportioning at any time, so it's not a big deal if you don't get it right the first time.



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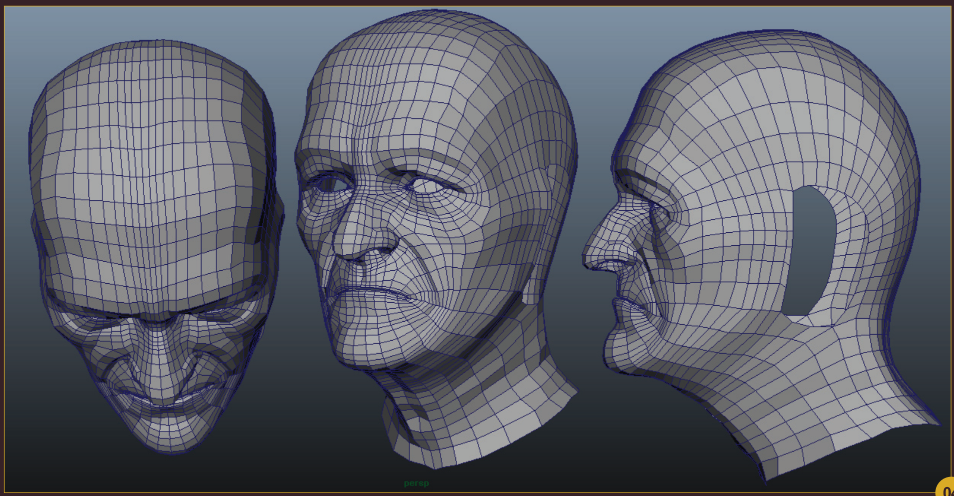

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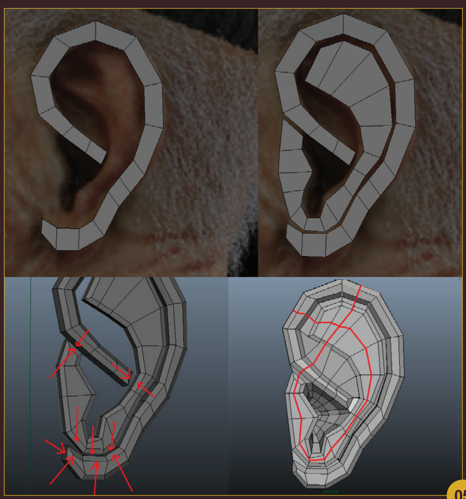


05

Later in the process, if you think your mesh is too dense, feel free to optimize it as you like, but first make sure every edge is serving its purpose, and contributes to the form and construction of the mesh.

**Fig.04** illustrates my result on the same mesh after pulling and pushing the geometry, and some mesh sculpting inside Maya.

Before we continue with more detailing it's important to have all of the head features complete.

Once we attach the ear to the head model we will become completely ready for final tweaking and proportioning. So let's continue with the ear.

You can hide all objects at this time and leave only the image planes visible. You can use the same image plane as you used for the head, or if you like you can make a new one with an ear image of your own choice.

Modeling the ear is all about laying out correct topology that will follow the major ear shapes. The ear is a complex shape and to better understand the shape I strongly recommend you learn the Latin names of the ear features.

Use the Create Polygon tool from the Mesh menu to create a single quad polygon, place it at the start of the ear lobe and extrude it all along the helix, as illustrated in **Fig.05**. Repeat the same process for the inner part, which is called the antihelix. Do your best to match the

number of polygons to the helix and the edge placement. Try not to add too many polygons at the beginning; keep it as simple as possible.

Select all the polygons and extrude them twice; on the second time extrude with a slight offset. Now delete the polygons marked with red arrows from both shapes and all the polygons from the back, and then bridge the corresponding edges. Also add one more edge loop to slice the inner shape. For the last few steps, check **Fig.05**.

Select the loop in the ear hole and extrude it a few times to shape that area. Using the same technique, extrude the outer edge border to shape the back of the ear.

Now use the same strategy as we did for the face, reshape the existing geometry by using Soft Selection with the Move tool and Sculpt Geometry tools (**Fig.06 – 07**).

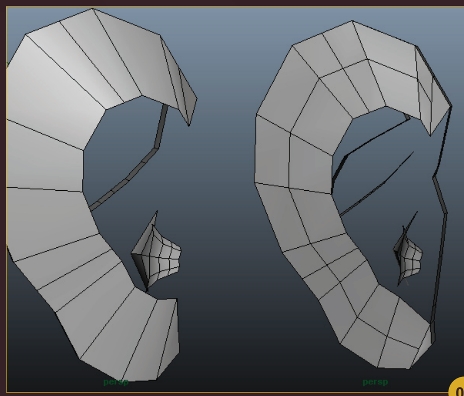
Now unhide the head geometry, select the edge loop on the opening and extrude it twice to prepare the head for connecting with the ear. Select Average Vertices from the Mesh menu to smooth out the newly created shape. Place the ear in position and start to use Soft Selection with Move Transform to reshape the opening on the head to fit the ear better. Combine the two objects into one mesh.

You will find that the two objects do not match in terms of topology and edge placement, and you might reduce some of the edges from the back of the head or add some to the ear before merging an ear to the head. Start from the part facing towards the front by selecting close-matching edges and bridging between them. This way all non-matching edges will stay at the back of the ear, which is unlikely to be visible. Do your best to keep the polygons four-sided.

After some tweaking, I've got the result illustrated in **Fig.08**.

After successfully attaching the ear to the head let's move on to finalizing the rest of the mesh. Grab the edge loop at the border of the mouth, opening and extrude it as many times as necessary to create a mouth bag. At this point duplicate the eye mesh to the other side of the head and, if you like, make a few more extrusions to the base of the neck. You will most certainly find more edge loops than you need so feel free to optimize the mesh as you like. You can use the mesh I provided with this tutorial to compare your result with mine. Lighter geometry will be much easier to unwrap and prepare for texturing, which is going to be our next step.

When you have all your geometry in place, once again use the Sculpt Geometry tool and Soft Selection to evaluate the shape and proportions.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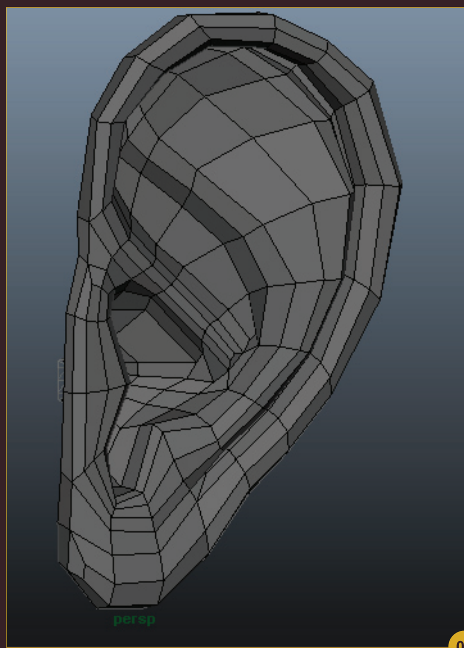
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Until the next tutorial, happy verts and polys!

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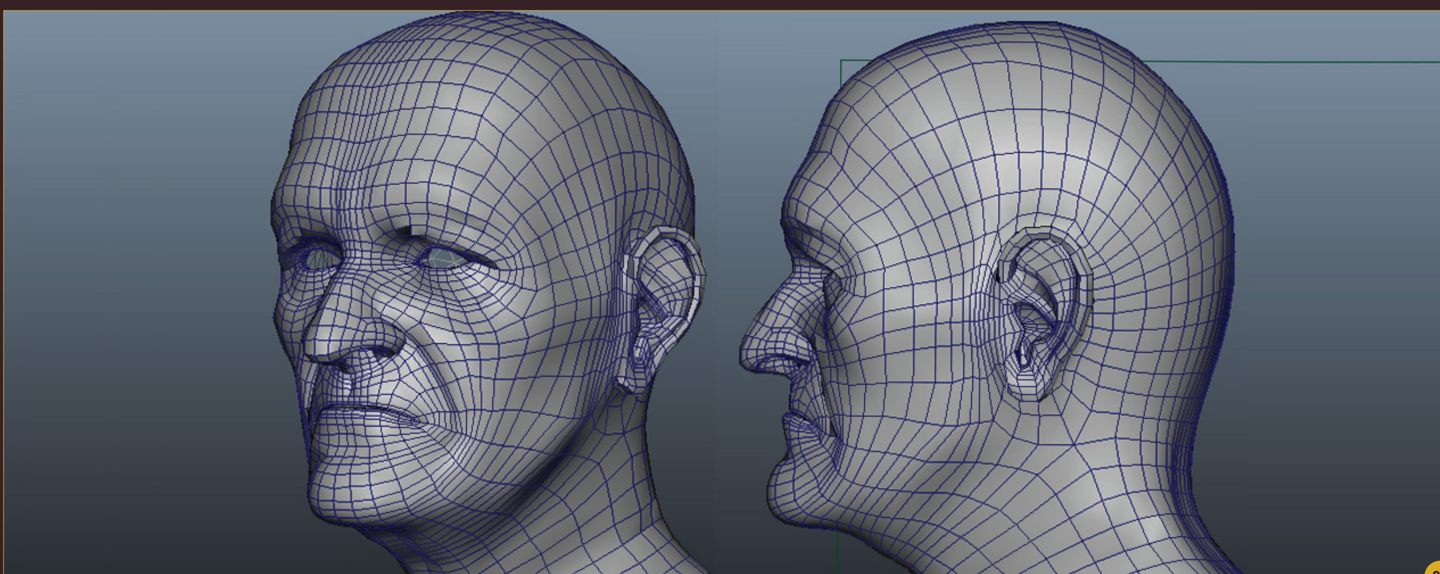
08

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# THE ORANGE

"Similar to the sketching phase I started with basic primitives and shapes. This step was when I was able to finalize the shape and form of the robot"

DOWNLOAD RESOURCES

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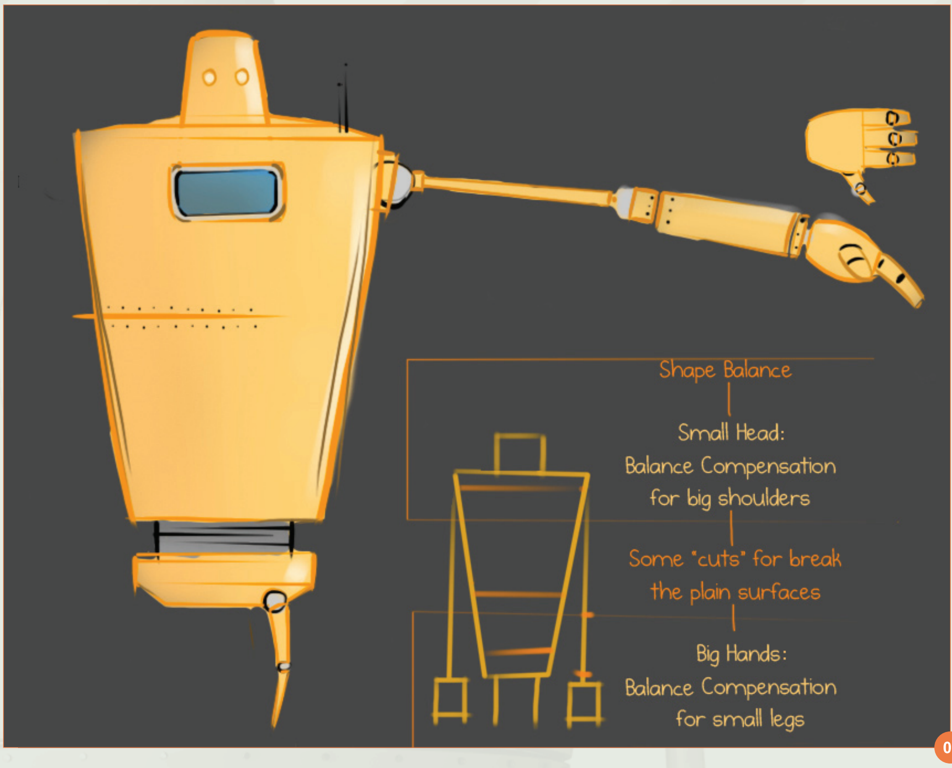
Riccardo Zema's fondness for robots led to this fun, retro design. In this month's Making Of he takes us through the process he used to bring this character to life.

# THE ORANGE

Software used: LightWave




01

## CONCEPT

The idea behind this character was actually very simple. I've always liked robots, so I thought I'd make one with a clean and simple design. I thought I would make it look a bit retro rather than similar to the modern robots that we see a lot of these days.

## SHAPES AND WEIGHTS

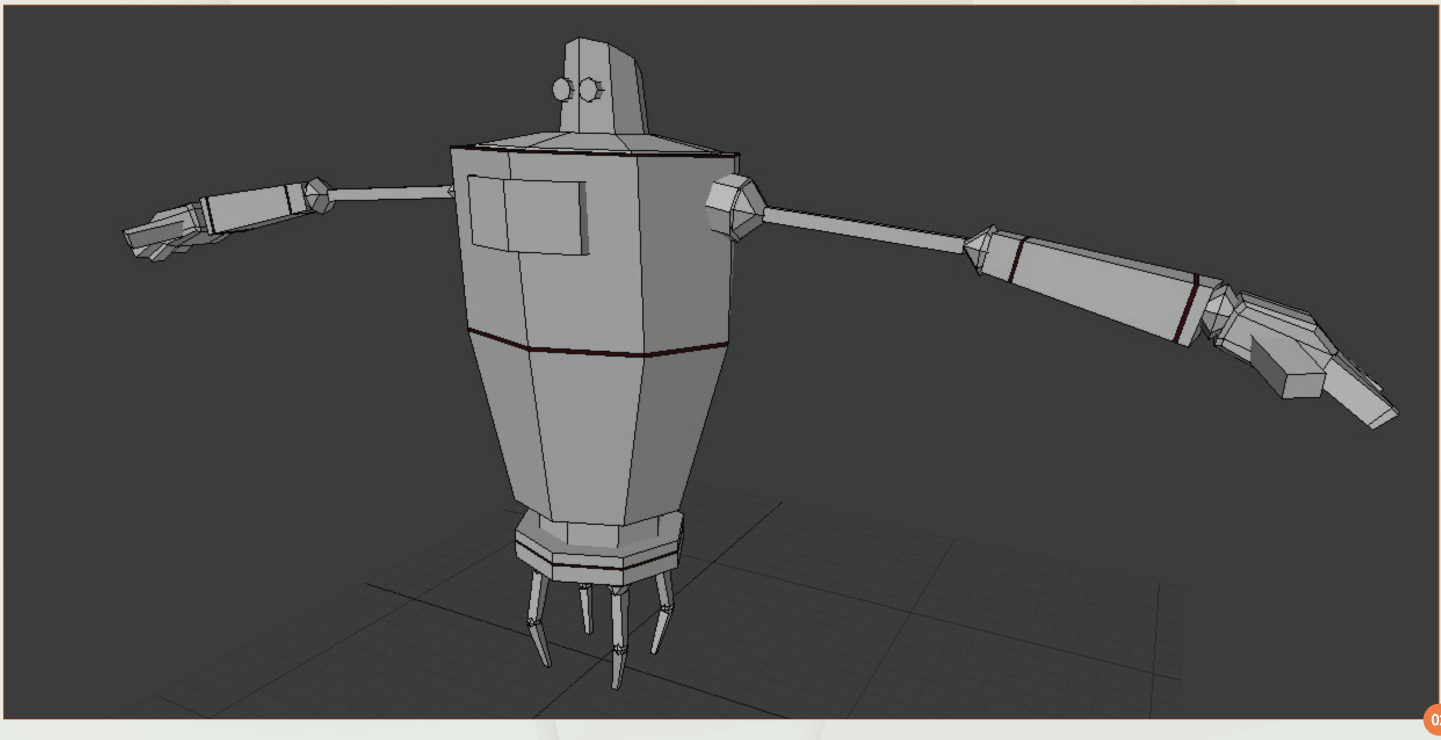
I started by sketching in Photoshop using a few simple lines to create a nice, well-distributed shape. I then dedicated some time to making sure that the character looked balanced. Every image has a virtual weight that is perceived by the viewer's eye. This weight is demonstrated in many elements of the picture like the composition, light, shadows and shapes. When I had spent some time sketching and considering my design, I came up with what you can see in **Fig.01**.

## BOX MODELING

The next step was to begin the model. Similar to the sketching phase I started with basic primitives and shapes. This step was when I was able to finalize the shape and form of the robot. In **Fig.02** you can see the basic model, which I created in about five minutes.

## HARD SURFACES

With the box model in the background I started to model and detail each individual part. The model wasn't complicated to create because of the simple forms so I won't talk too much about the modeling process. The only important thing to talk about and explain further is the hard surfaces. The model was made from individual subpatches in LightWave. This is basically a process by which the basic geometry is smoothed to create simple forms. The only problem with using this approach is that you lose some of the hard edges in the corners of your model.



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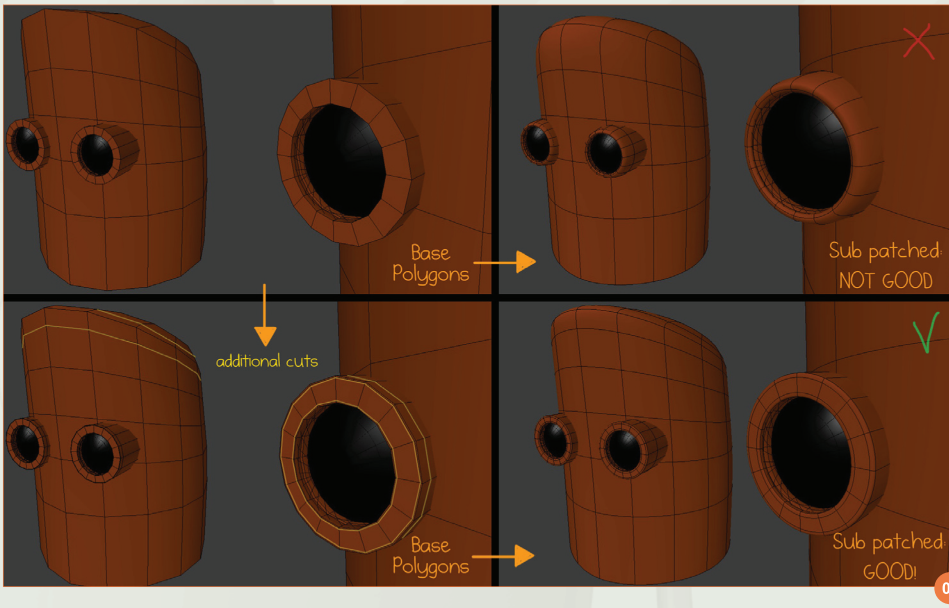
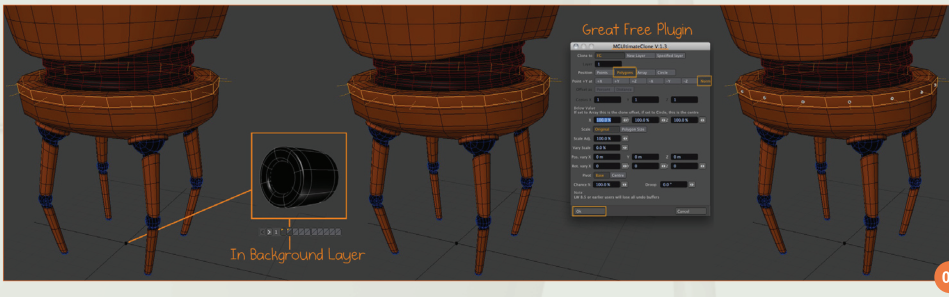
As far as I am aware there are two solutions for creating hard surfaces using this technique; you can either weight the suitable edges or add additional cuts. I excluded edge weight because it was not compatible if I decided to export the model and use it elsewhere, so the trick I chose was to just add extra edges loops near the borders that needed to be sharp (**Fig.03**).



03

## Small Details

The last step after completing the mesh was to add the rivets. To add them I cloned one using a plugin, which repeated them around the body. Rivets were an important detail because they broke the plain surface of the body of the robot and at the same time they added some nice, smaller details (**Fig.04**).



04

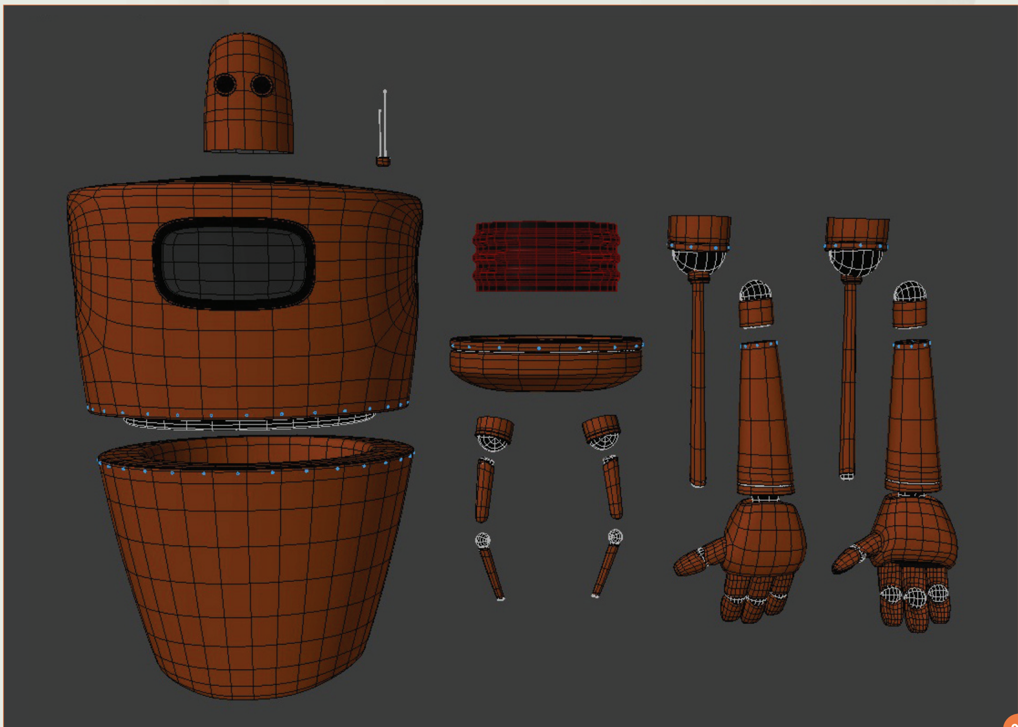
## Final Model

The model was now ready to be posed! You can see the wireframes of the individual parts in **Fig.05**.

## Rigging and Pose

I decided to rig the character so I was free to pose him as I chose and also so I would be able to animate him in the future. In LightWave you can rig a character in two different ways. You can use bones, which you assign to each part of the robot and apply weight maps to, or you can use hierarchies and separate all the robot parts into layers and animate them using their original pivot points.

To describe all of the rigging process would require me to write a very long tutorial, but I would always suggest that you use the first method as I did because it gives you more control and causes fewer headaches (**Fig.06**).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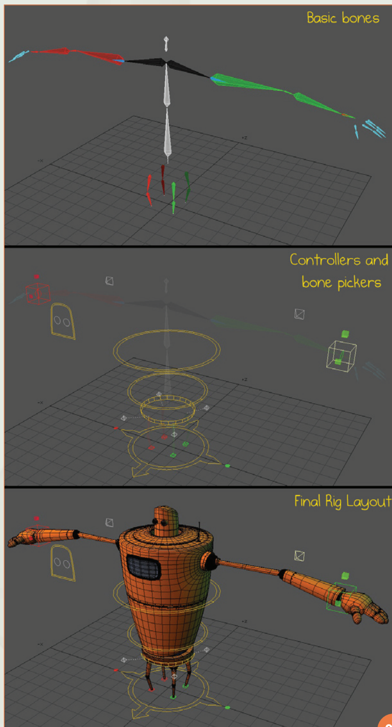

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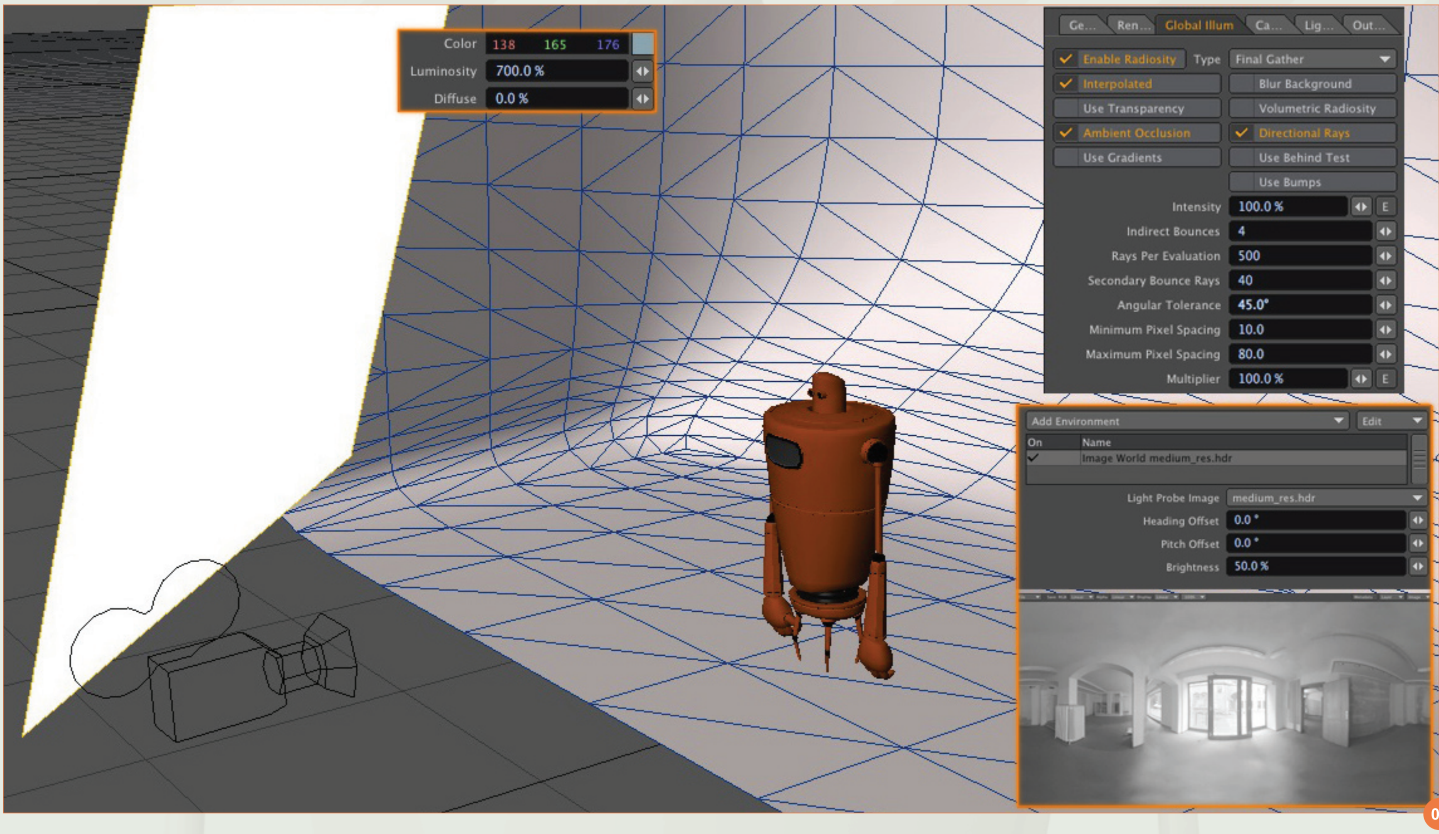

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If you download the free resources with this tutorial you will see an example video that shows how the model was rigged.

## Materials and Lighting

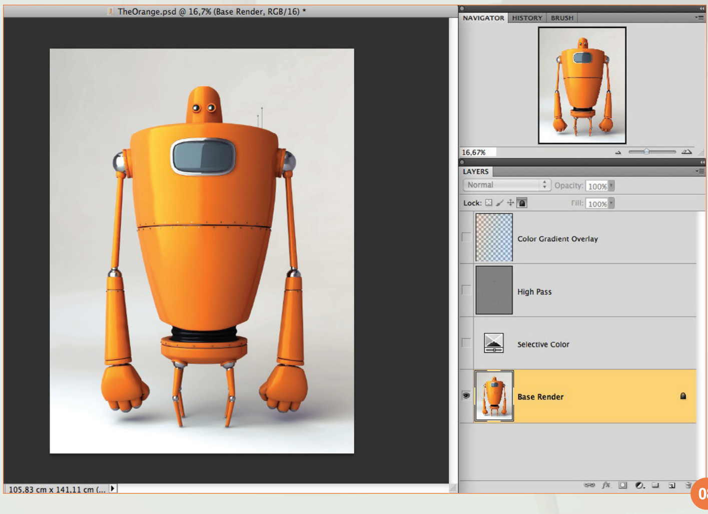
The materials I chose were basically simple and clean. Chrome was used for the joints and rivets, rubber for the hip junction and a basic orange, blurred metal for the rest of the body.

The layout of the scene was pretty simple too. Basically I recreated a white photographic studio set with rounder corners, a luminous polygon and a HDRI. The luminous polygon really makes the difference as it creates a nice diffuse light, and at the same time adds a nice reflection to the model that highlights the shape and adds more depth to it. The HDRI was very subtle, but did enough to add small reflections on the rivets and eyes too. I chose a vertical format for the image to match the shape of the robot (**Fig.07**).

## Post Processing and Color Corrections

Once the final render was complete it was time to do some work in Photoshop. The final render actually looked very nice, but when I thought about the original concept it was clear that the render didn't have the vintage look I wanted (**Fig.08**).

I thought that this could be fixed with simple color adjustments so I researched vintage photos and found examples of the type of image I wanted to create. I noticed a color gradient that seemed similar in a lot of the photos, so I tried to apply this to my image. To do this I used Curve corrections as they give you more control than if you just use the Color Balance tool (**Fig.09**).



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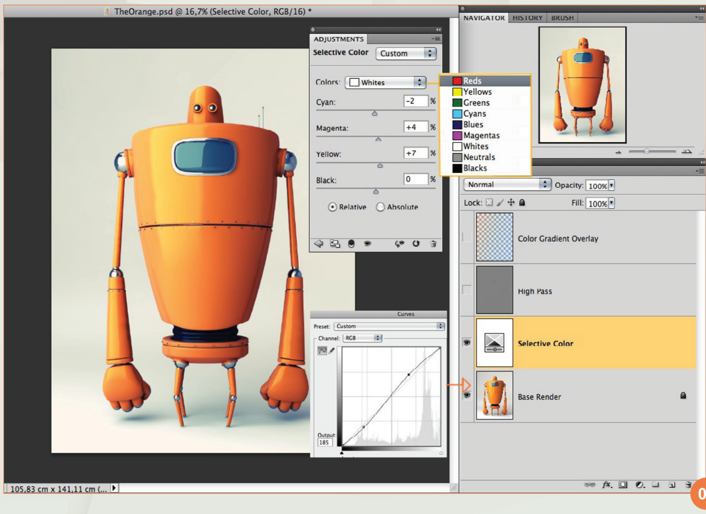

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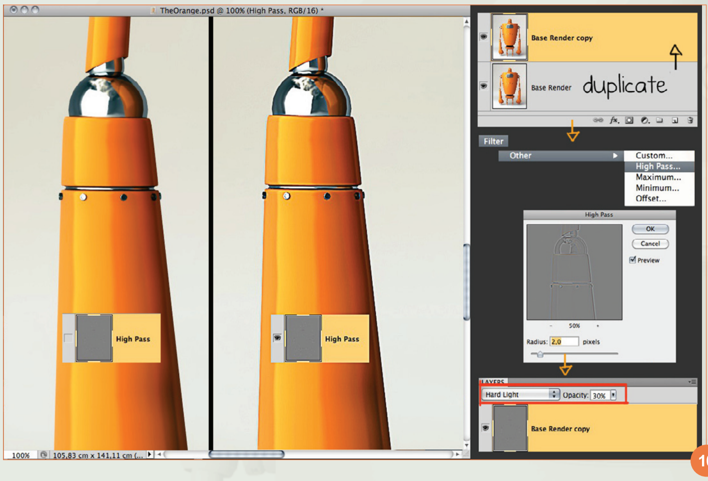


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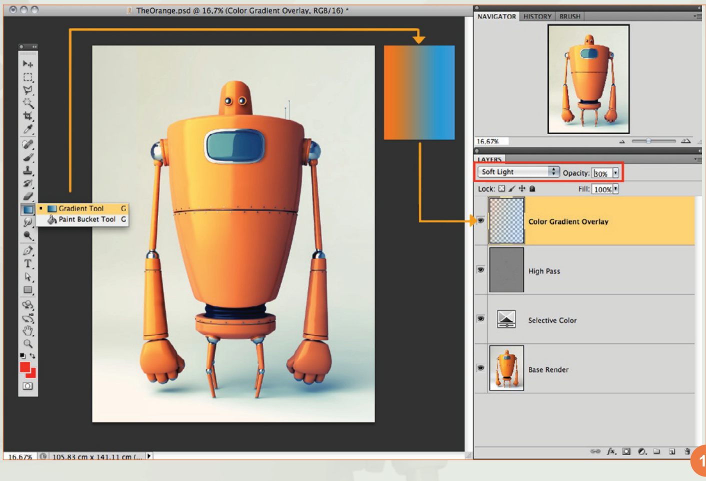



11

## High Pass

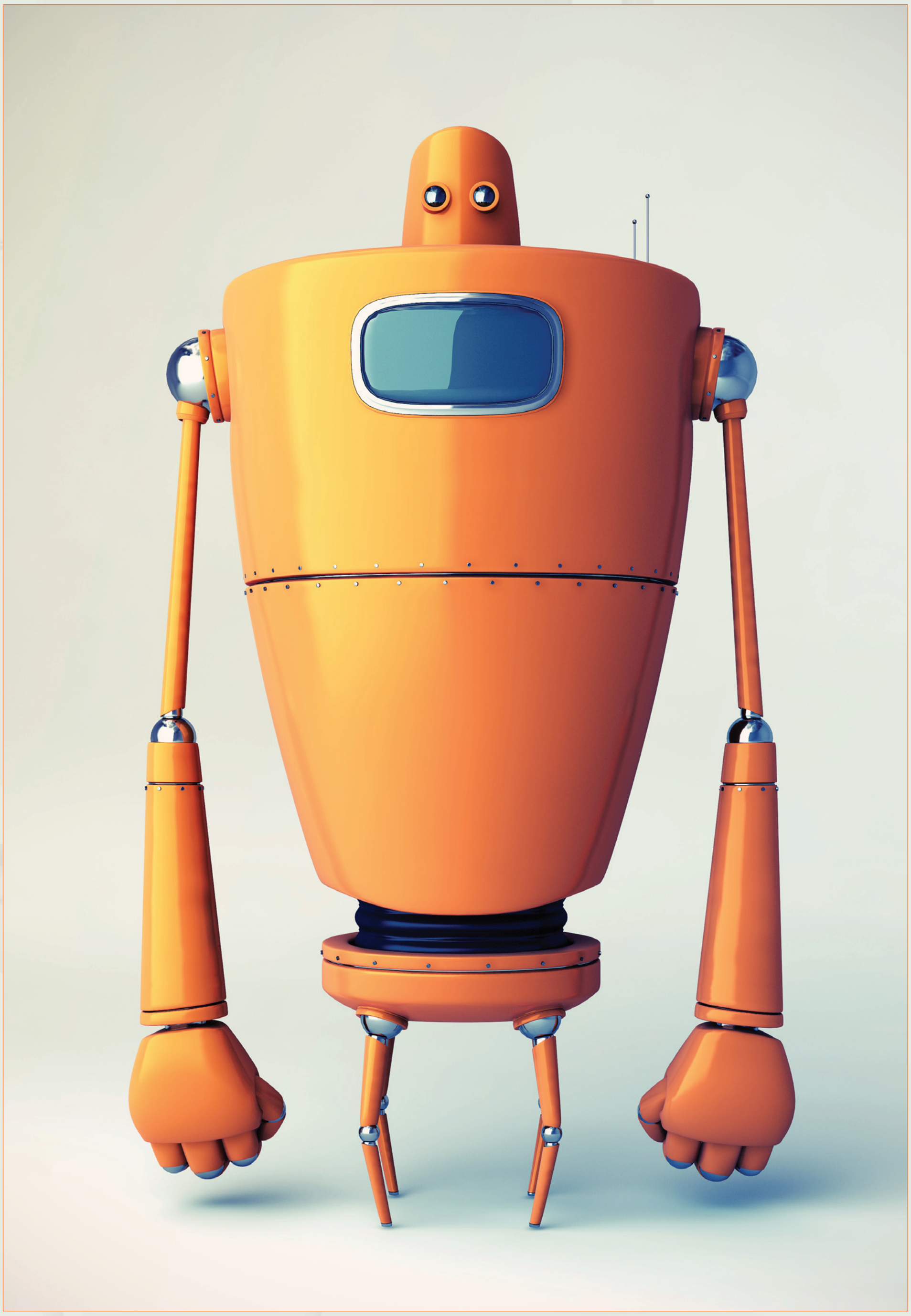
Due to the anti-aliasing the rendered image lost some sharpness in the final output. To fix this in Photoshop I used a High Pass filter. The High Pass filter finds the most contrasting areas of the image and masks the rest with a 50% gray. The higher the pixel radius is in the filter panel, the sharper the image will be. After creating the high pass mask I set the blending mode to Hard Light to enhance the general reflection on the image, especially on the chrome (**Fig.10**).

## Color Gradient

The final step was to create a nice gradient in the shadows. I used an orange/blue gradient over the image and set the blending mode to Soft Light. This mode is similar to Overlay, but more subtle and useful when working on shadows. These notes about blending modes are not absolute rules and cannot be applied to every image; the key is to test the modes and see what works for you. When this was done the colors looked nice and I was happy with the image (**Fig.11**).

## Conclusion

It's not very easy to describe the creative process behind a 3D image as every step is made up of many more small steps, but I hope that in some way this tutorial is helpful to you and that you enjoyed reading it.



Riccardo Zema

Web: http://kidqube.com

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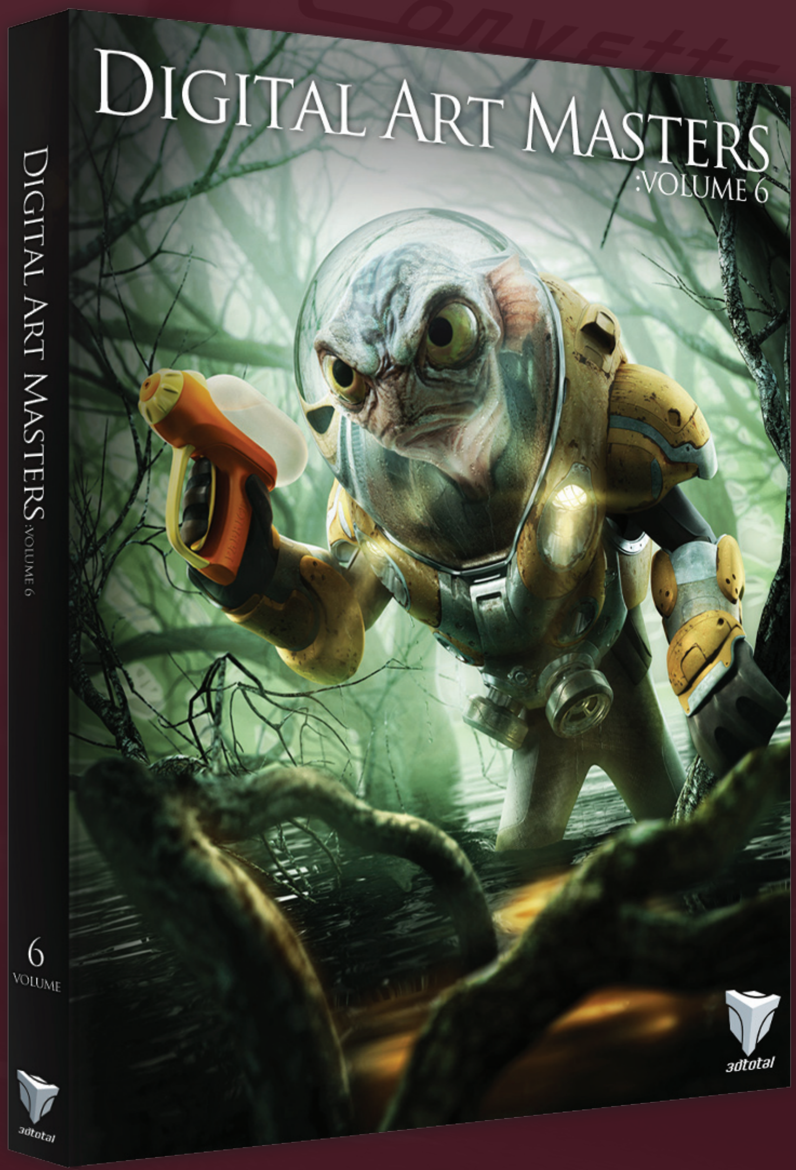


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**This month we feature:**

### "Corvette C1"

by Piotr Tatar

The following shots of the “Corvette C1” book pages are featured here in full-resolution and can be read by zooming in...


# Corvette C1

By Piotr Tatar

Job Title: 3D Artist

Software Used: 3ds Max, V-Ray, After Effects and Photoshop

## Introduction

The idea for this C1 Corvette evolved during the formation of another, more important, project for me – namely an animation using the same scene. The animation focused on a duel between two more recent vehicles (Ford Mustang GT and Ford GT) on the tarmac at New York's JFK airport. It was essentially an educational exercise, as well as a way of exploring new ideas in the field of graphics and animation. Whilst working on the animation I had the opportunity to prepare a detailed model of the Corvette C1, which would have disappeared somewhere in the depths of my hard drive had I no desire to test the animation. The test renders proved so rewarding that I decided to focus more on this beautiful classic car as opposed to the animation itself. The result is a collection of several images, which serve only to confirm the fact that it was worth deviating from the animation.

## Modeling

The modeling alone didn't cause any major problems. The road surface needed to be well prepared before anything else, requiring suitable blueprints and a few hundred megabytes of photos before proceeding. It pays to group your photos and compose similar shots into one image. When using blueprints in the composition I like to create an additional setup with the same images in order to accurately align (match) them with blueprints. Apart from the obvious differences, it is often better to refer to the photographs and, in some cases, even make a compromise.

The body of the car almost begged for a “general to specific” approach. The first phase involved modeling the shape of the overall car and ignoring the details (**Fig.01**). At this point I considered the mesh topology and took into account the cuts that would be added at a later stage.

The next phase involved inflating the density of the base mesh by converting the model into an Editable Poly and combining this with the Meshsmooth modifier. When the detail is sorted, you can re-condense the grid, but it may have a high density and an excessive number of polygons in the final version. However if you care about the smoothness of the model and a faithful reproduction, such steps might be advisable. It is worth remembering to model and organize the detail similarly to the actual object in question, thus creating a better end result (**Fig.02**). Here is the entire scene without any materials (**Fig.03**).

## Texturing and Materials

Although the main focus in the scene is the Corvette, an important role is also played by the environment which required a few more substantial textures. Help at this stage came via **www.cgtextures.com**, which offers a huge number of high quality textures. Among other things I found the textures relating to asphalt, concrete blocks and hangars; however, in order to use them in the scene they had to be modified. For example, when creating the asphalt texture I used three different pictures and combined them in Photoshop using the Stamp tool. The results provided a seamless texture that could be used along the entire length of the road (**Fig.04**). I followed a similar approach in the case of the tires, which comprised of two pictures.

To achieve some nicely detailed close-ups with small imperfections, I commonly use the Displacement modifier. This can be quite demanding on the computer, but produces a good end result which compensates for the loss of time. Displacement proves very useful for objects such as asphalt, tires and cement blocks, etc. All of these elements had a texture so it was easy to generate a Displacement map. More work was required to produce maps for the headlights (**Fig.05**), which have been restored with great attention to detail as the plan was to render some close-ups (**Fig.06**).

As for the shaders in the scene, it turned out that the coating material was to be the most important. Usually I use a base coat that I later modify to satisfy the project requirements, which is exactly what I did in this case. The paint shader is based on the shellac material in 3ds Max. It is mixed with two layers of reflections, the first one being crisp and the second one providing a more diffuse and glossy look (**Fig.07**). I also used bump maps

40 Title of section

Title of section 41

The following shots of the “Corvette C1” book pages are featured here in full-resolution and can be read by zooming in...

consisting of a Mix map and various degrees of noise. Their intensity must be small to create a fine paint texture close-up (**Fig.08**).

### Lighting and Rendering

Lighting proved to be quite problematic due to the fact that the scene had been prepared for animation. I tried to create a natural ambient lighting suitable for a wide variety of shots. Achieving this was a lengthy process and initial tests were not promising. Here is how it looked in one of the first lighting tests (**Fig.09**). I used HDRI maps of the sky to simulate a light approaching sunset. When rendering I recommend using a HDRI map since it generates more interesting shadows and reflections. I had to relinquish this type of lighting for the animation because of the longer rendering times. In earlier projects HDRI maps were usually accompanied by additional Direct Light in order to add character to global shadows. However with this project I used VRay Sun, which generated much better shadows closer to the setting sun.

During the rendering I tried to achieve an optimal result in order to have more control during the post-production. All renders were made into 32 bit png files, which allow a fairly deep contrast and color correction at a later stage. Along with the main render I tried to generate a lot of different passes from render elements. Helpful passes proved to be VRay Reflection, VRay Refraction, VRay Z-Depth and VRay Wire Color to create masks for the individual elements (**Fig.10**).

In addition, I prepared a separate scene to create a shadow pass, which required

1: Render

2: Refraction pass
3: Shadow pass

4: Curves
5: Replace color
6: Levels

7: Depth of field from Z-Depth

42 Title of section

Title of section 43

some post-production work (**Fig.11a – f**). To do this it was necessary to assign a standard white material to each object with the Self Illumination set to 100 and make the background a matte object. You must remember to turn off the HDRI map as it could brighten the shadows unnecessarily.

### Post-production

Post-production proved to be one of the nicest stages in this project as I could inject a definitive character through the renders. I used all the rendered passes prepared in advance to help achieve the desired result. Elements such as dirt across the lens and headlight beams were also added at this stage (**Fig.12**).

### Conclusion

The project, which was initially to be a lighting test, ended up revolving around this particular aspect. I'm glad that I managed to escape the main theme of the animation and devote some time to rendering the Corvette. Had this not been the case it is unlikely that I would have appeared in this book. I am delighted to have had the chance to show you my work and hope that there will be people who have gained just a little bit of knowledge from this account.

8: Scratches map
9: Sun glow

10: Gradients and Corvette logo

### Artist Portfolio

All images © Piotr Tatar

44 Title of section

Title of section 45


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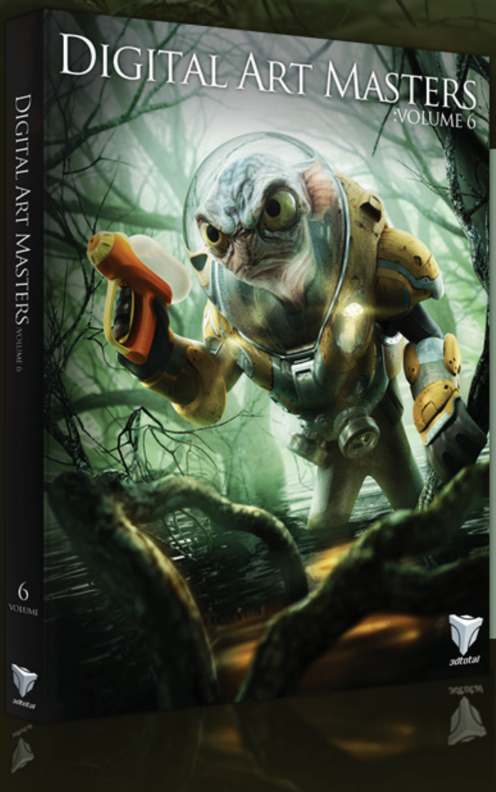
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## Contact Information

http://www.3dtotal.com

http://www.3dcreativemag.com

http://www.2dartistmag.com

Editor & Content Manager > Simon Morse

simon@3dtotal.com

Lead Designer > Chris Perrins

chrisp@3dtotal.com

Marketing > Tom Greenway

tomg@3dtotal.com

## Partners

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